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Cable Address ..... Autoland, Philadelphia
Telephone ..... Sherwood 1424

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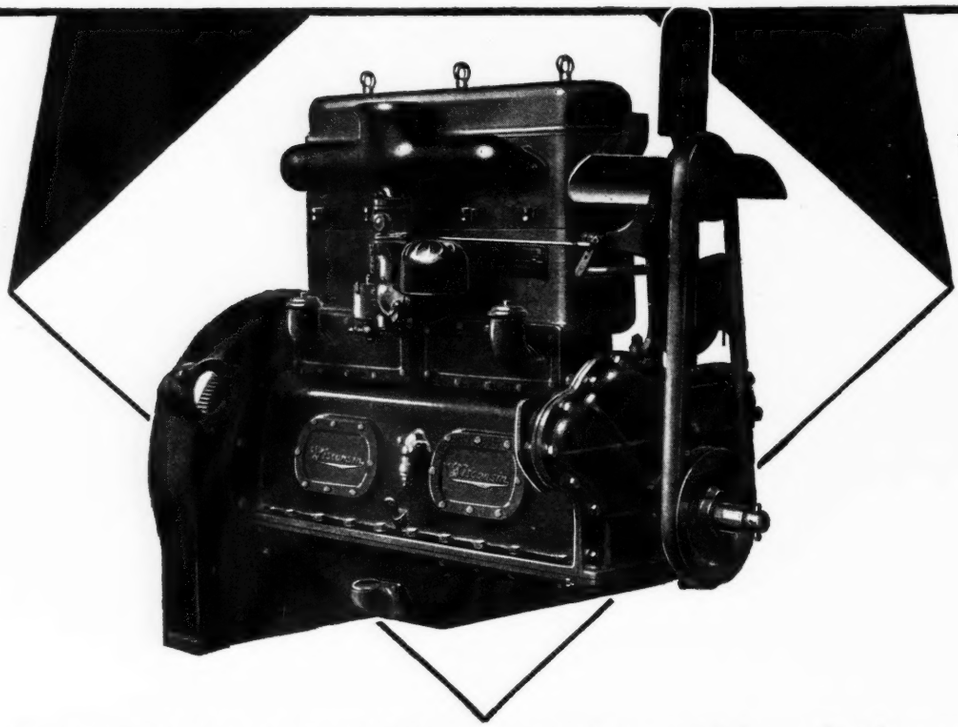
MORE POWER per CUBIC INCH

Maker of Friends



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AUTOMOTIVE INDUSTRIES

VOLUME 59 *Philadelphia, Saturday, August 18, 1928* NUMBER 7

Automotive Supply *Manufacturers Extending* Warehouse System

Trend is toward increase in establishment of factory-owned stocks at strategic trade points for convenience of "merchandising wholesalers", survey indicates.

By Leon F. Banigan

Editor, Motor World Wholesale

A GROWING tendency among manufacturers who distribute through wholesalers to establish warehouse stocks at strategic points to serve their wholesale customers is revealed from several interesting angles in recent surveys made by the Motor & Accessory Manufacturers Association and *Motor World Wholesale*. These studies indicate that the past year has witnessed quite a substantial development of this activity, and, what is equally as interesting, a favorable attitude on the part of wholesalers.

To appreciate the causes for increasing establishment of warehouse stocks, it is necessary to consider briefly the fundamental changes that have been present in the evolution of the average wholesale establishment.

This trend, hardly discernible three years ago, is today an established fact in the minds of most men with practical experience in the wholesale automotive supply business. The demand today is for a merchandising wholesaler and recent investigations of the Motor & Accessory Manufacturers Association in distribution practices have indicated that more manufacturers of replacement parts, shop equipment, small tools, accessories and garage supplies are seeking contact with retailers through more merchandising wholesalers. As in all evolution, the developments of the past few years in automotive wholesaling have tended to keep some of the old, even when it is obsolete, and take on some of the new, even before it has proved itself. Some of the larger wholesalers, serving large territories have clung to the warehousing function in name while assiduously practicing hand-to-mouth buying. Some have essayed aggressive merchandising activities in these large territories in which they were not always set up to serve in the intensive selling way that smaller territories may be served.

For the purpose of this discussion, wholesalers will be referred to in what follows as "warehousing wholesalers" and "merchandising wholesalers." By warehousing wholesalers we mean the old-line type of jobber, who came into automotive distribution primarily as a source of supply for retailers; who carried adequate stocks of merchandise to serve the retail demands of his territory; who traveled salesmen to take the orders of the retailers and who financed those sales to the retail trade. He functioned primarily as a warehousing distributor. By merchandising wholesaler we mean the wholesaler who buys largely hand-to-mouth, who seeks to serve, not through his warehousing function, but through the intensive selling effort he puts behind the merchandise he handles—either through concentrating his selling effort in a small territory or through concentrating it upon a limited number of lines to which he can give this intensive effort.

Speaking quite broadly—possibly too broadly, but it will serve to emphasize the point—some old-line jobbers have greatly weakened what was their strongest fundamental reason for being in business—*warehousing*—by practicing hand-to-mouth buying.

SOME manufacturers of automotive supplies have maintained warehouse stocks for a number of years, particularly on the Pacific Coast and on the Atlantic seaboard or in the Mississippi Valley.

The present development, however, as this article points out, tends toward the multiplication of warehouse stocks as bases of supply of a more sectional character.

At the same time, they have minimized their chances for profitable operation by engaging in a function which they were not always fundamentally set up to perform and for which they were not always adequately compensated by the manufacturers—*merchandising*. No practical business man will claim that there have not been strong influences present to dictate such procedure on the part of the old-line wholesalers; but hindsight somewhat suggests the above conclusions.

Nothing has happened in the wholesale business, however, to minimize the necessity for adequate warehouse stocks strategically located either in the establishments of wholesalers or some other organization to serve the physical distribution needs in the flow of merchandise from our great manufacturing plants through 100,000 retailers to more than 20,000,000 car owners.

Both Functions Necessary

Both functions—warehousing and intensive selling—seem necessary under present-day conditions.

Just how these functions will be performed are still open questions. They grow more acute as manufacturers, forced to resort to widespread, intensive wholesale selling by competitive conditions, find more and more of the warehouse function being pushed back on their own doorsteps.

The established resale prices, the scale of discounts to wholesalers which exist today, do not always contemplate and provide for the increased distribution costs which are accompanying the numercial expansion of merchandising wholesalers to whom manufacturers must ship direct, and more frequently and in smaller lots than they did in the days of exclusive old-line jobber distribution.

If the need for the warehousing function is not acute for some manufacturers today, it may be in the future. The distributive function must keep pace with the selling function and may even make necessary and profitable the establishment of warehousing and distribution organizations to serve the intensely selling and hand-to-mouth buying wholesaler.

Except for a score or so of the larger manufacturers, warehousing is a comparatively new activity. Reports from both manufacturers who have established warehouse stocks recently and wholesalers who are patronizing them indicate that there is a wide divergence of opinion at the present time and a real need for closer study of all phases of the problem by both manufacturer and wholesaler.

Who will perform the warehousing function—superwholesalers, commission warehousemen, manufacturers' agents, factory branches, etc.? Will the wholesaler be permitted to draw upon warehouse stocks only for emergency shipments, slow moving and semi-obsolete merchandise? Will he be required to assume a part of the expense of maintaining warehouse stocks in the form of advanced merchandise prices or shorter discounts on stock drawn from these sources?

Warehousing Practices Studied

These and many similar details await solution through the study and experience of those manufacturers who voluntarily or through force of circumstances will inaugurate methods of insuring adequate physical distribution of their products to match the aggressive merchandising that present competition demands. In the meantime, the growing tendency of manufacturers to establish warehouse stocks—principally under direct control of the manufacturer is indicated by the following facts taken from a much more detailed report that has just been made to members of the M. & A.M.A. by Neal G. Adair, manager of the Sales Development Department.

Experiences and Opinions of Manufacturers Regarding Warehouse Stocks

	A.E.A (old line) 106 wholesalers, Reporting	Service Parts Wholesalers, 100 Reporting	Other Wholesalers and distributors, 92 Reporting
Extent of Warehouse patronage:			
Percentage of Wholesalers drawing on warehouse stocks	91	90	84
Percentage receiving more than 20% of all shipments from warehouses	18	34*	27*
Percentage receiving 11 to 20% from warehouses	8	6	9
Percentage receiving 6 to 10% from warehouses	23	26	16
Percentage receiving up to 5% from warehouses	42	24	32
Warehouse service charges:			
Percentage of wholesalers paying extra charge for shipments from warehouses	36	57	41
Percentage paying extra to some manufacturers	15	18	10
Percentage paying no extra	49	25	49

Among the warehouse practices of 122 manufacturers investigated, it was shown that 54 (approximately 44 per cent) maintained warehouse stocks at points other than the factory, while 68 (approximately 56 per cent) did not. The greatest warehouse activity is at present in the service parts group, in which about 65 per cent of the manufacturers maintained warehouse stocks. Approximately 50 per cent of the shop-equipment manufacturers are maintaining warehouse stocks and 22 per cent of the accessory manufacturers. "The current progress of the warehouse movement," the report says, "is illustrated by the fact that one-third of the manufacturers have inaugurated regional stocks or added to previously established systems within the past year."

The survey shows 34 cities in which automotive warehouse stocks are located. The five leading warehouse cities are San Francisco, Chicago, New York, Kansas City and Atlanta. The next six are Dallas, Los Angeles Detroit, Boston, Seattle and Philadelphia, the latter three equally recognized by manufacturers. The majority of companies maintain two warehouses, one almost invariably on the Pacific Coast and the other in the Middle West or on the Atlantic seaboard, depending on the location of the factory.

Cities in which warehouses are maintained, with the number of manufacturers represented in each city, are as follows:

Warehousing Cities

Atlanta, 12; Boston, 7; Buffalo, 2; Charlotte, 1; Chicago, 24; Cincinnati, 2; Cleveland, 3; Dallas, 10; Dayton, 1; Denver, 1; Detroit, 8; Elgin, 1; El Paso, 1; Great Falls, (Mont), 1; Houston, 2; Kansas City, 15; Little Rock, 1; Los Angeles, 10; Memphis, 1; Milwaukee, 2; Minneapolis (or St. Paul), 6; Newark, 4; New

of 298 Wholesalers on Stocks

	A.E.A. (old line) wholesalers, 106 Reporting	Service Parts Wholesalers, 100 Reporting	Other Wholesalers and distributors, 92 Reporting
Commonest extra charge reported (%)	5	5-10	..
Attitude on warehouses:			
Percentage favoring warehouses in their territories	75	69	71
Percentage who would favor product of manufacturer with warehouse in territory, other things being equal	88	87	92
Attitude on warehouse shipments to retailers:			
Percentage reporting satisfactory experience in warehouse shipments direct to retailers on jobbers' orders	60	63	74

*Among the service parts wholesalers reporting 29% receive 31 to 50% from warehouses, 5% receive more than 50%. Among other wholesalers and distributors (not A.E.A. or service parts) 16% receive 21 to 50% from warehouses, 11% receive more than 50%.

York (or Brooklyn), 20; New Orleans, 1; Omaha, 1; Portland (Ore.), 2; Philadelphia, 7; Pittsburgh, 2; Richmond, 2; San Antonio, 1; San Francisco, (or Oakland), 38; Seattle, 7; Shreveport, 1, and St. Louis, 3.

Many Products Warehoused

The largest number of warehouse stocks maintained by any manufacturer is 23. Another maintains 17; another 13; another 11. Two companies maintain eight warehouses each. One has seven. Three companies have five. Seven companies have four. Four companies have three. Seventeen companies have two. And 14 companies have one. The largest number of companies have two wholesale stocks at points other than the factory.

Among the service parts group of manufacturers, 65 per cent of whom maintain warehouse stocks, the products represented include axle shafts, battery terminals, bearings, bushings, brake assemblies and parts; brake, clutch and transmission lining; drag links, gaskets (metal and fabric), gears, metal hose, pistons (pins and rings), chassis springs, switches, tie rods and valves. The cities in which service parts manufacturers have warehouses and the number of manufecturs represented in each city are as follows:

Atlanta, 9; Boston, 6; Buffalo, 2; Chicago, 13; Cincinnati, 2; Cleveland, 3; Dallas, 6; Dayton, 1; Denver, 1; Detroit, 3; Kansas City, 9; Los Angeles, 7; Memphis, 1; Milwaukee, 1; Minneapolis and St. Paul, 4; Newark, 4; New York and Brooklyn, 12; Philadelphia, 6; Pittsburgh, 2; Portland, Ore., 1; Richmond, 3; San Francisco and Oakland, 18; Seattle, 3; Shreveport, 1; St. Louis, 2.

Warehouse stocks are handled by the manufacturers' employees in the plans of mine manufacturers; five manufacturers entrust their warehouse stocks to manufacturers' agents; two manufacturers handle stocks through their own organizations in some cities and through manufacturers' agents in others; three manufacturers handle stocks through their own employees in some cities and commercial warehouse men in others. Two manufacturers use jobbers in some cities and manufacturers' agents in others, and two use jobbers in some cities and warehouse men in others.

Fifteen companies make no charge for shipments from warehouse. Eleven companies add freight or price charge; seven companies add a straight price charge averaging 6 per cent; one company adds freight from factory to warehouse; another adds freight plus 5 per cent.

Service Parts Manufacturers

The largest number of companies maintaining warehouses are among the piston manufacturers; piston rings, gaskets, chassis springs and bearings are next, with valves, radiators and brake lining next, and bearings following. Six of the service parts manufacturers among the 41 investigated share warehouse space with other manufacturers. (Slightly more than a year ago, the M. & A.M.A. made a survey among service parts manufacturers. Of the 18 companies that filed complete returns in both the present and the previous surveys, eight made no change in the number of their warehouses, seven added warehouse points and three reduced the number of their warehouse stocks).

In the accessory manufacturers group, the principal products on which warehouse stocks are maintained by manufacturers were bumpers, chemicals, drag link boots, heaters, jacks, engine heat indicators, shock absorbers, spark plugs, spring covers, tire chains, towing chains, etc. The cities where manufacturers of accessories have warehouse stocks and the number of manufacturers represented in each city are as follows:

Atlanta, 2; Charlotte, 1; Chicago, 5; Dallas, 2; Detroit, 3; El Paso, 1; Great Falls, Mont., 1; Houston, 1; Kansas City, 2; Little Rock, 1; Milwaukee, 1; Minneapolis and St. Paul, 1; New Orleans, 1; New York and Brooklyn, 3; San Antonio, 1; San Francisco, 8; Seattle, 2; St. Louis, 1.

Four accessory manufacturers maintained warehouse stocks handled by their own employees. One manufacturer uses manufacturers' agents. Two use commercial warehouses.

Six companies make no charge for shipment from warehouse. Four companies make a freight or price charge; and three companies add a straight price charge averaging 6 per cent. The average shipments from the warehouses of accessory manufacturers are about 30 per cent. of the total shipments.

Accessory Manufacturers

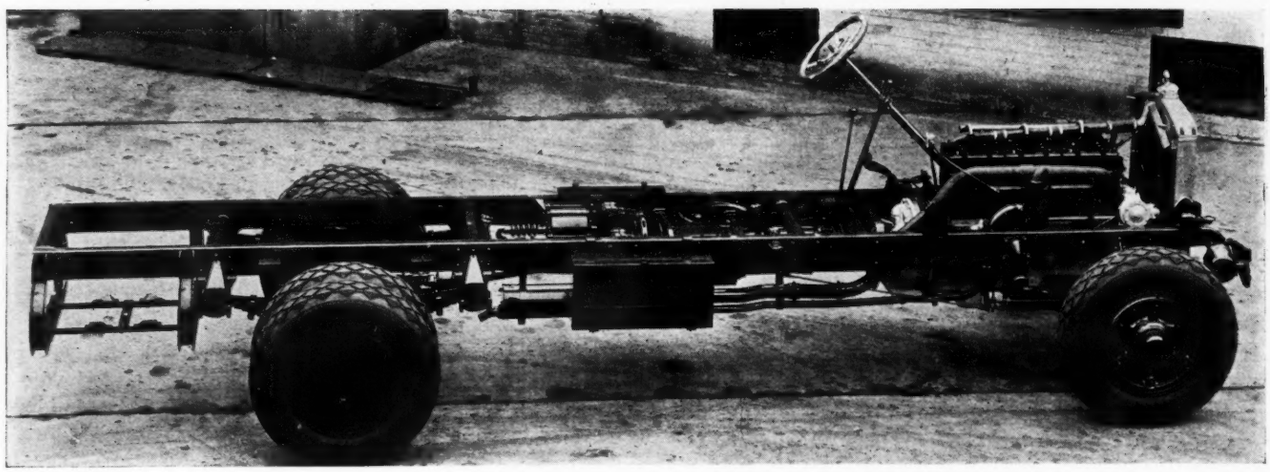
The following products are among those most frequently found in warehouse stocks of service equipment manufacturers. Air compressors, bins and shelving, car washers, cranes, electric testing and charging apparatus, electric tools, grease guns, hoists, jacks, paint-spray equipment, presses, pneumatic valve grinders, reamers, runways, service lamps, tire changers, towing and wrecking apparatus, wrenches and other small tools.

The cities in which shop equipment manufacturers maintain warehouse stocks and the number of manufacturers in each are as follows:

Atlanta, 1; Boston, 1; Chicago, 6; Dallas, 2; Detroit, 2; Elgin, 1; Houston, 1; Kansas City, 4; Los Angeles, 3; New York, 5; Philadelphia, 1; Portland, 1; San Francisco or Oakland, 12; Seattle, 2; St. Paul, 1.

Warehouse stocks of six companies are maintained

(Continued on page 237)



Chassis of Mack Model BJ six-cylinder truck

Mack Six-Cylinder *Truck* Combines Speed *and* Ruggedness

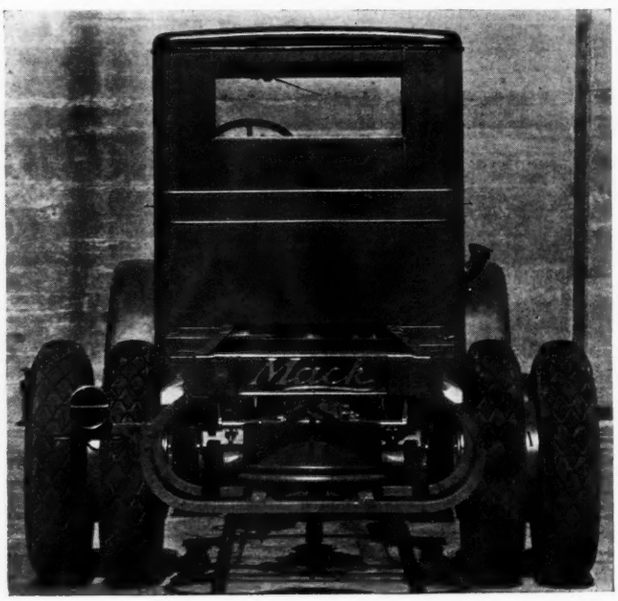
Model BJ chassis designed primarily for long distance and rural motor express work. Engine similar to latest bus type. Battery ignition is used.

By P. M. Heldt

DURING the past decade there has gradually built up a demand for high-performance commercial vehicles. High speed and high acceleration were offered first in the lighter trucks, and the results achieved with these vehicles were so significant that similar performance was sought in the heavier machines. It was found that the stresses resulting from the combination of heavy loads and high speeds were very severe, but what difficulties were met on first attempts were gradually overcome, and the tendency toward higher truck speeds continues.

The first move on the part of Mack Trucks, Inc., to satisfy this new demand consisted in launching the bus-commercial, in both four and six-cylinder types, of 2½-3 and 3½-5 tons capacity respectively. This was a modified bus chassis with truck body, and while there was a certain market for this type of vehicle, it was found that the chief demand was for a machine combining the performance characteristics of the bus with the simplicity, ruggedness and all of the usual attributes of the motor truck (such as loading platform floor height, for instance). It is to meet this demand that the Mack firm has just appeared on the market with a new six-cylinder, pneumatic-tired truck known as the Model BJ.

The new chassis represents several departures from previous Mack practice. It is the first six-cylinder truck ever marketed by the firm, and also the first truck ever put out by it with battery ignition (and with complete electrical equipment). The BJ was designed to meet the new demands with respect to speed, acceleration and hill-climbing ability; simplicity and ease of operation; comfort for the operator; powerful braking equipment, a short turning radius and a moderate length of wheelbase. The wheelbase is greater than that of the average truck of its load rating but less than that of a 29-passenger bus.



Rear view of truck chassis showing cab and spare tire carrier

To make such performance possible the new truck is powered with a six-cylinder 94-hp. engine of 4¼ in. bore by 5 in. stroke, similar in

its general design to the latest Mack bus engines. The large displacement makes it possible to obtain the desired performance at reasonable engine speed, and thus without undue noise and vibration, and it makes it unnecessary to provide more than four forward gear speeds, which simplies the control. The job is adapted primarily for long-distance transportation and for rural motor express services. For this reason particular attention was given to the comfort and convenience of the driver, and a de luxe, coupe-type of cab was designed which is completely inclosed, yet can be thoroughly ventilated. It is of the composition wood and aluminum type. The seats are unusually deeply upholstered. The fuel tank is mounted under the seat, and the filler spout and gas level indicator project from the right-hand side of the cab, for convenience in filling. These trucks are sold with pneumatic tires only, and they are not furnished as dump trucks.

It is not necessary to go at length into the details of the engine, as they were dealt with in these columns only a short time ago. Suffice it to point out that they include such features as block cylinders, aluminum-alloy heads cast in pairs, aluminum-alloy pistons with invar struts, tubular connecting rods, turbulence-type of combustion chambers, a 3½-in. crankshaft with case-hardened bearings, an aluminum-alloy crankcase, case-hardened, drop-forged timing gears with generator-ground helical teeth, and a transverse shaft for the pump and distributor drive which is driven from the camshaft gear through 90-deg. helical gears of which the driven member is of bronze.

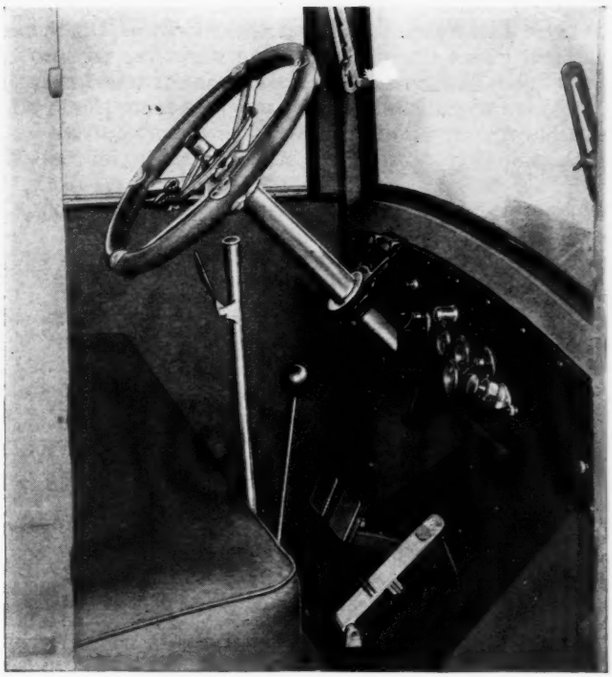
Engine Features

Lubrication is by a combined splash and pressure system, a double oil pump being used which supplies oil separately to the splash troughs and to the main and connecting rod bearings, to the latter under pressure. In order to reduce oil hammer, an oil bell is incorporated in the line, and an oil filtrator is also fitted.

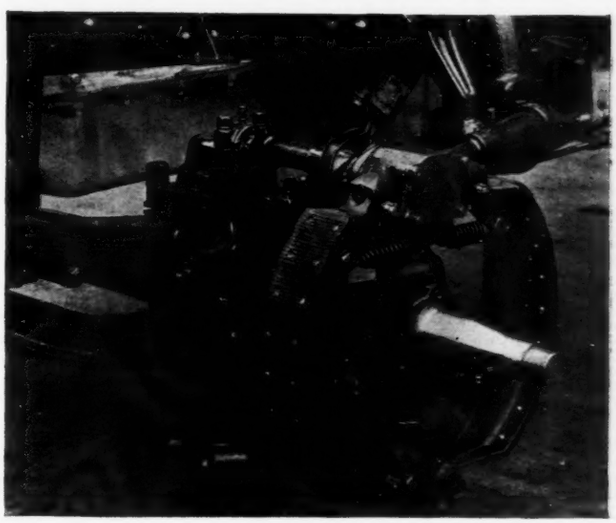
The water pump is of the rustless type, comprising an aluminum body, a bronze rotor and a stainless steel shaft. The radiator is of the continuous finned tube type, with aluminum top and bottom tanks and side plates, and is mounted on the frame on rubber shock insulators. Its fan is 22 in. in diameter and is driven by a V-belt. A gutter is formed under the hood seam which catches rain water and drains it off, so it cannot get into the engine space. The radiator cap is of the hinged type and is locked with a wire bail. A Moto Meter, which is standard equipment, is permanently attached to the cap. Another item of standard equipment in connection with the cooling system consists of vertical radiator shutters, which are of the regular Mack type.

The electrical equipment is of North-East make and comprises a 12-volt, 135-watt generator (instead of the 600-watt size used on buses) with voltage control. The storage battery is carried in a steel box bracketed securely to the left side of the frame, a similar box on the right side serving for tools. Ignition timing is partly automatic and partly by hand. The wiring is in accordance with underwriters' requirements, the various wires being carried in rigid and flexible tubing.

The clutch is of the single-plate, dry type and is inclosed in the flywheel. The driven member consists of an annular disk of molded asbestos which at its inner edge is riveted to a steel disk, the latter in turn being riveted to a drop-forged splined hub or center. A cast aluminum cover for the clutch is bolted to the flywheel and forms part thereof, the cover being provided with a drop-forged spider with a bushing for the clutch shaft. Back of the throw-out bearing there is a very large clutch brake which is provided with a spring to insure easy braking action and prevent grabbing. An aluminum bell incloses the lower halves of the flywheel and clutch and protects them from splashing mud, while the upper halves are left exposed for more effective ventilation and cooling. The clutch has no adjustment, being so designed as not to require it, but there is an adjustment on the throw-out bearing. An aluminum bracket secured to the bell housing supports the clutch pedal and the accelerator. These parts are generally supported on the frame, but the use of rubber shock insulators for



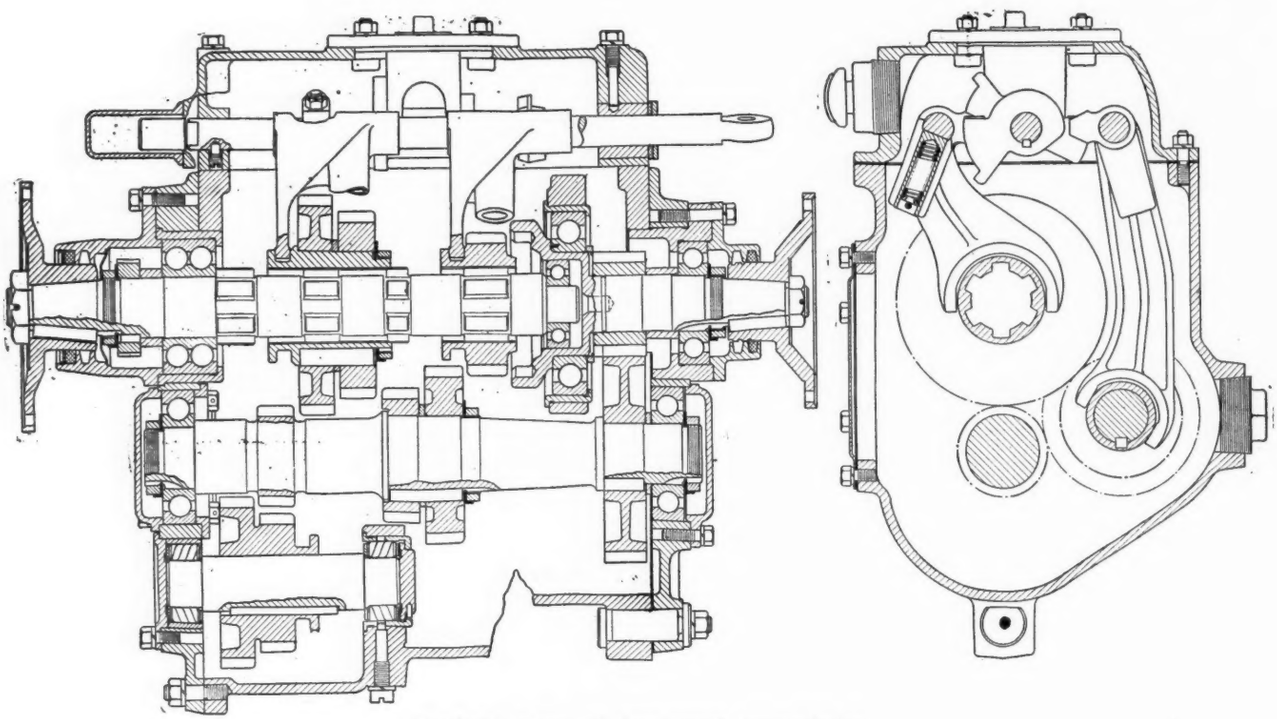
View in driver's cab. Note resemblance to a passenger car driver's compartment



Details of front wheel brake

engine mounting makes necessary the construction used in this case, so that any weaving of the frame will not affect the controls. For a similar reason the brake pedal bracket is secured to the frame side rail.

The transmission is a unit separate from the engine and is connected to the latter by a primary driveshaft with a Spicer 500 Series metal universal joint at the forward end and a Mack rubber torque insulator at the rear. The reason for making the transmission a separate unit is stated to be that a four-speed transmission for a heavy-duty vehicle of this type cannot well be combined with an engine. If it were made liberal in size it would form too great an overhang from the engine rear supports, and the only alternative would be to skimp the parts. An aluminum case is being used, for the reasons that it permits of a saving in weight, has a better heat conductivity and is less sonorous than ferrous metals.



Sectional views of four-speed transmission

Aluminum Transmission Case

Aluminum transmission housings have long been used by Mack, and in the past it has been customary to use steel mounting rings or bushings, as the aluminum alloy is considered too soft to sustain the pressure of the ball bearing outer race directly. In the new transmission, Mack engineers have combined the features of steel mountings for the bearings with an I-beam support for the transmission by using steel I-beam end plates. Bearing boxes for all except two of the bearings of the transmission are contained in deeply yoked bulkheads at the ends of the aluminum box. All of the bearings of the transmission are antifriction bearings, even those of the reverse idler. The transmission drive pinion, instead of overhanging its bearings, as is the usual practice, is straddle-mounted between two ball bearings, and the splined shaft is piloted in a ball bearing inside of the rear bearing for the drive pinion. There is no intermediate support for the secondary shaft, which can readily be made of sufficient diameter to give the necessary degree of rigidity. The two shafts of the transmission lie in the same horizontal plane.

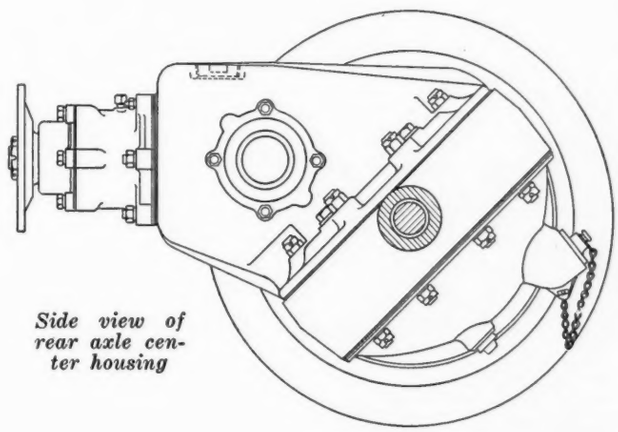
The splined shaft on which the sliding pinions are mounted is provided with so-called interrupted splines, which have been a feature of Mack transmissions for many years past. The shaft is made from a forging and has those portions on which the splines are cut upset. The sections between splines are finished by grinding, and the splines, which are formed by the hobbing process, are cut to a greater depth than that represented by the surface of the ground sections. The sliding pinions have their bores ground and these ground surfaces contact with the ground surfaces of the sections of the shaft between splined sections. Since both of these surfaces are generated by grinding and the tolerances are quite close, a very substantial support for the sliding gears is obtained. The splines being formed by the hobbing process, it is possible to have square corners at the bottoms of the spline grooves, and the conventional undercut is done away with, thus eliminating a feature tending to weaken the shaft.

Another unusual feature of the Mack transmission is the control. This being a four-speed-and-reverse transmission, there are three sliding yokes and three slider bars, as usual; these bars, however, do not project through the walls of the case but are entirely contained in the cover plate of the housing. The control mechanism extending out of the case consists of a single bar which has both a rocking and a reciprocating motion. By means of the rocking motion it is connected to one of the other of the slider bars, and the reciprocating motion slides these bars and moves the pinions to which they are connected into and out of mesh. All shifter yokes are drop forgings. Assembling the slider mechanism in the cover of the transmission housing has the advantages that it makes the latter a deep box, which is stronger and less given to

sounding board action; that it brings the inspection opening closer to the shafts, thereby facilitating certain inspection operations, and that it results in the mechanism coming off with the cover, so that it can be taken over to a work bench and worked on there.

Location of Transmission Cover

The location of the transmission cover also is a departure from ordinary practice. There are three possible positions—on top, underneath, and at the sides. The cover is usually placed on top, but in a truck a transmission cover so located is of little use because it is directly below the body floor and is inaccessible unless there is a trap door in the floor of the body, which latter is not looked upon with favor by users. One reason against a cover on the bottom is that it comes rather close to the ground and when a mechanic slides under it on a sliding cot there is very little room for him to work in. Moreover, working with the arms extending upwardly is uncomfortable and tiring. For this reason the cover is arranged at the side of the transmission case and extends the full depth of the case. The side face is the smallest of three available for the cover, and making the inspection opening in it results in the least weakening of the case.



Side view of rear axle center housing

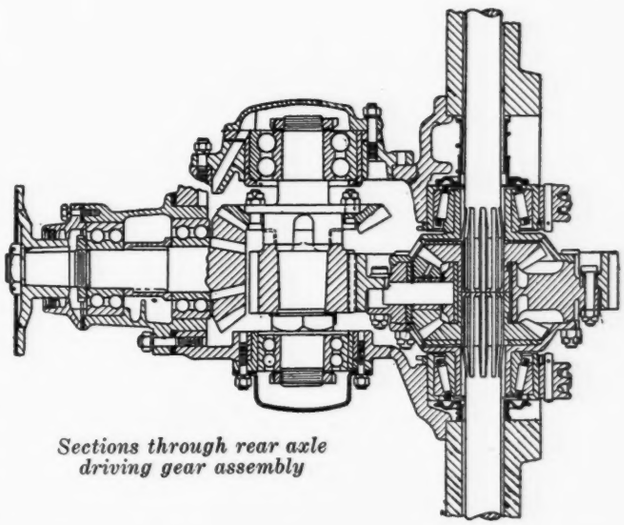
Rubber shock insulator mounting is used also for the transmission. The supporting arms forged integral with the end plates of the housing are supported on rubber cushions in brackets secured to the main frame side rails. This mounting not only protects the transmission from strains due to weaving of the frame, but also facilitates removal and replacement, as alignment is assured by the rubber blocks and no close registry of holes in steel parts is required.

Drive to the rear axle is through a secondary tubular propeller shaft with Spicer 600 Series metal universal joints at both ends. The final drive is through a double reduction gear train comprising a bevel gear set followed by a spur gear set, both inclosed in a housing at the center of the rear axle. The axle is of the full-floating type and its housing is a drop forging. It will be noticed from the drawings herewith that the central ring of the banjo housing, which in most designs is vertical, in this case is inclined at 45 deg., and the gear carrier, which supports the pinion shaft, the countershaft with its bevel gear and spur pinion, and the differential gear with the spur-type crown gear, is bolted to its forward and upward face. Bevel pinion shaft and countershaft both are mounted on double-row ball bearings, while the differential is mounted on taper roller bearings. The Hotchkiss drive is employed, the rear springs being rigidly mounted on the drop-forged axle housing and taking both the torque and driving thrust.

Two completely independent braking systems are provided. One advantage of this is that on long down grades it is possible to use the brakes alternately, thus giving each set a chance to cool off. The transmission brake is of the disk type, comprising a disk which, when the brake is applied, is gripped between diametrically opposite sets of brake blocks that are actuated by means of an eccentric motion. An advantage of the disk type of brake on the transmission is that it has little overhang and therefore stresses the transmission main shaft rear bearing less severely. The disk of this brake is secured to the companion flange of the Spicer joint at the forward end of the secondary driveshaft and is located close to the rear bearing. The shoes are carried by a heavy tubular cross-member and operation is by hand lever.

Brake Details

The foot brake is a four-wheel brake and is provided with a vacuum booster. Front-wheel drums measure 18 by 3 in. and rear wheel drums, 16 by 6 in. This makes the braking surface at the rear wheels considerably larger, which is desirable because in a loaded truck there is much more weight on the rear than on the front wheels, and much more braking power can therefore be exerted by the former. The brakes all have drop-forged shoes with independent hinge pins. Rear brake drums are of cast steel and provided with heavy flanges at the open sides and with integral cooling fins. There is considerable air space between the rear brake drums and the rim of the inner tire, and the spoked wheels have large openings in them so that the air can circulate freely. The brakes are completely inclosed. In order to prevent brake application from being affected by the Hotchkiss drive, the eyes on the brake camshaft levers are located close



Sections through rear axle driving gear assembly

to the axis around which the rear axle turns under the influence of driving and braking torque. The drum of the front wheel brake is in the form of a napkin ring; that is, it has no web but a substantial outward flange at each side, and it bolts directly to the wheel. The front brakes are actuated by cams on shafts that are ball-jointed to a chair on the front spring clip. Hence there is no motion of the ball

joints as a result of spring action, and these joints work only when the front wheels are swung around their pivots in steering.

All brake adjustments are made by means of wing nuts without the use of tools, and the adjustments are self-locking. The effort of brake application is proportioned between front and rear, but no equalizing device is inserted between brakes on opposite sides of the truck. The location of the adjusting wing nuts directly on the brake arms makes it an easy matter to adjust the brakes so those on opposite sides will hold substantially equally. Very heavy tubular cross shafts are employed in the brake hook-up which will not flex measurably under the forces of brake application.

Remote Control Brake Valve

The B.-K. booster brake is of the type in which the cylinder is mounted rigidly on the frame, but it acts on both the rear and the front brakes. The booster is controlled by means of a remote control valve which is connected to the primary brake rod. Should the vacuum fail for any reason, pressure on the pedal applies the rear wheel brakes directly, without the drag of booster or front brakes.

The frame is straight from end to end, but the frame side rails, which are of heat-treated stock, are tapered. Both channel-type and tubular cross-members are used. There is a tubular cross-member between the front spring horns. Then follows a drop-forged cross-member at the front of the engine which is bolted to the side rails and carries the shock insulators on which the pressed steel front engine bearer is supported. At the rear of the engine there is another drop-forged cross-member which carries the drop-forged rear engine bearer on rubber shock insulators. The next cross-member is of pressed steel and of inverted U section, and it carries the gearshift and brake lever mountings. There is a large tubular cross-member directly back of the transmission. This is followed by two channel-section cross-members, and in addition there is another tubular cross-member at the rear spring rear bracket. No gussets are used in building up the frame, but instead the cross-members are flared to form gussets. One of the results of this construction is that there are no bolt or rivet holes in the frame channel flanges between axles (which is the most highly stressed section of the frame).

The usual semi-elliptic spring equipment is employed, but all springs are rubber shock insulated and the rear springs are equipped with two-stage helper springs. These are semi-elliptic springs secured to the rear axle directly over the main springs. The ends of these helper springs are at different levels and as the frame comes down under increasing load, the buffer lugs on the side rail contact first with one and then with both ends of the helper spring.

I-Section Front Axle

The front axle is an I-section drop forging of special design to provide against the stresses arising from front-wheel braking. The axle ends are of the reversed Elliott type and the portion of the axle between the spring seat and the axle end is of very heavy T section, the flange width increasing from the end to the spring saddle, so as to provide adequately against both brake torque and bending moments due to striking road obstructions. The tie rod, which is straight from end to end, is located back of the axle and is provided with micrometer adjustment. Ball connections are used on the tie rod. These are of the keyhole safety type, completely inclosed and spring-cushioned.

A worm and complete gear type of steering mechanism is used. Hyatt roller bearings are used on the gear shaft and ball bearings on the worm shaft. The steering column is raked for comfort in driving and is braced at the cowl by means of a rubber-bushed aluminum bracket. The steering wheel itself is molded of fabric and rubber, and spark and throttle levers and the horn button are mounted on top of it.

Thirty gallons is the capacity of the rectangular-section fuel tank which is mounted under the driver's seat but not connected to the cab in any way. The cap of the filler spout is of the hinged, spring-retained type. Fuel feed is by means of a Triplex electric pump.

The cab is supported at the rear on rubber shock insulators, thus relieving it of strains due to frame distortion. Hinged sedan-type doors are fitted, and crank operated window regulators.

The voltage regulator is mounted in a box on the front of the dash and all fuses are inclosed in a steel box accessible through a flush plate on the instrument board. The cowl has a flush-type ventilator and is also provided with an outboard drain which prevents water from getting into the engine compartment.

As regards the control devices, the shift lever is provided with a hard-rubber ball, and a triggerless reverse latch is provided, the whole lever being pressed down to unlock the reverse position. The brake lever is of tubular construction, with a spoon-type latch, while the accelerator is of the pedal type.

Standard equipment includes Tiltray headlights mounted on S.A.E. standard brackets, dashlights, a combination stop and tail-light, and an instrument light. Tires are 36 by 8 in. all around, single in front and dual at the rear, and they are fitted to spoked steel wheels with demountable rims. The spare tire is carried under the frame at the rear on a carrier which automatically centers the rim against the top clamp, the rim being held down by large wing nuts. Other items of equipment not common on heavy trucks are crowned fenders and running board aprons.

The truck is available in three lengths of wheelbase, viz., 168½ in., 192½ in. and 218 in. The length available for the body back of the cab is 12 to 16 ft. The wheel gage is 71⅜ in. front and 66 in. in the rear.

A POINT in connection with the characteristics of Diesel engines is brought out in an item in the *Commercial Motor* based on a communication from Wm. Beardmore & Co., builders of high speed Diesel engines. It is stated that whereas the output of a carburetor type engine falls off appreciably when the temperature of the engine exceeds a certain value, owing to the expansion of the incoming charge and the consequent loss of volumetric efficiency, with a Diesel engine there is no such effect. Tests were carried out with a high-speed Diesel engine with the cooling water at 240 deg. Fahr., the cooling system being kept under pressure, and under these conditions there was no appreciable falling off in the power. Of course, the amount of air entering the cylinder will be affected the same in the Diesel as in the carburetor engine by an increase in cylinder temperature, but the Diesel engine runs normally with a large excess of air, which is necessary in order to be able to burn the bulk of the fuel injected in the very short time available. With an increase in the temperature of the air, vaporization and combustion evidently proceed more rapidly and not so large an excess of air is needed.

N.A.C.C. Appears Unjustly Accused of Blocking *Bus Regulation*

Evidence tends to show that manufacturers' objection to Parker bill extended only to certain features and that position on these has been made clear.

By Donald Blanchard

THROWING brickbats at the National Automobile Chamber of Commerce for its opposition to the Parker bill, providing for the regulation of interstate bus carriers, has become a somewhat popular sport.

One of the first of these brickbats, if not the first, was hurled by C. D. Cass, assistant to the managing director of the American Electric Railway Association, who said in part before the House Committee on Interstate and Foreign Commerce at the hearing held in April on the Parker bill: "It is further my deliberate judgment that the opposition that is presented here by this group of manufacturers is designedly fault-finding in its nature for the purpose of obstructing this legislation."

On April 28 the *Electric Railway Journal* published an editorial which stated that, "If the attempt to stabilize interstate bus operation through regulation should fail at this session of Congress there seems ample reason to attribute the cause largely to this unexpected last-minute disposition to try to make a regulatory law perfect in all of its details at its inception."

Denounced by A.A.A. Official

Again at the recent Cincinnati convention of the Bus Division of the American Automobile Association, S. A. Markel, chairman of the division's legislative committee, heatedly denounced the chamber for its opposition to the Parker bill.

The *Electric Railway Journal* reentered the lists in its issue of July 14, statements made recently by A. J. Brosseau before the Motor Transport Division of the American Railway Association and by E. F. Loomis before the Bus Division convention being made the occasion for these most recent brickbats. This editorial says in part: "Everyone seems agreed on the need for interstate regulation. Apparently, also, all of the principal interested groups, with the exception of the N.A.C.C., are agreed on the form and extent of the regulation. Although there were repeated efforts made to have the situation thoroughly thrashed out while a bill was in process of formulation, the N.A.C.C. chose to take a hand only when the matter reached a Congressional committee. In doing that it has definitely assumed the responsibility in the eyes of railway men and bus operators as well, of proposing something to take the place of the measure to which it objected. It is all very well for N.A.C.C. spokesmen to express accord with the general idea of regulation and to voice a desire to sit down with other interested groups to discuss a basis for a regulatory law. Just why that desire was not expressed during the long period that the Parker bill was under discussion and in process of formulation by all the other groups interested is hard to understand."

Subsequently the same editorial says: "It is high time to put aside the smoke-screen of glittering generalities, such as 'agreement on the need for regulation, and the desire to sit down to talk it over.' All the other groups involved have been sitting down and talking it over for some time. What seems needed most right now is a definite statement from the N.A.C.C. of just what it would consider advisable in the way of interstate regulation. Then there would at least be the opportunity of judging just how far that body is willing to go, and how much discussion is necessary before something really constructive can be done."

Summarized, the various criticisms of the N.A.C.C. policy referred to above and others that have been made at various times, seem to be as follows:

1. That the objective of the N.A.C.C. is to prevent any Federal regulation of interstate bus operation at this time.
2. That the N.A.C.C. held itself aloof from the various conferences leading up to the introduction of the Parker bill and that no opposition to that legislative proposal was expected from the manufacturers.
3. That, while agreeing that Federal regulation of buses is desirable, nobody knows what the N.A.C.C. would consider to be an acceptable translation of this general principle into legislation.
4. That the N.A.C.C. opposition was largely responsible for the failure of Congress to enact legislation at its last session.

Opposition is Resented

Before taking up these criticisms in detail, it might be well to point out that in the main the attacks on the Chamber have been more in the nature of criticisms of its temerity in appearing to oppose the bill before the Congressional committee rather than of the detail of the arguments it presented at that time. The interested attitude of the individual Congressmen making up the committee during the time that the Chamber's counsel, Larue Brown, was before it, however, tended to indicate to this observer at least that they regarded Mr. Brown's contentions as something more than an insistence "on conditions of administration more or less precise that tended to becloud the main issue."

The charge that the Chamber's policy has been obstructive in its intent is equivalent to questioning the sincerity of the manufacturers in stating that they are in favor of regulation. Whether this charge is war-

ranted or not depends largely on the justness of the second and third charges listed previously.

The N.A.C.C. participated in several conferences with the legislative committee of the Bus Division; particularly one in Washington late last year and another in New York during the second week in January. At these conferences Mr. Brown made a number of criticisms and suggestions with reference to the Denison bill which at that time was receiving the consideration of the Bus Division's legislative committee. Briefly the points he made were as follows:

1. That the definition of those who were to be made subject to regulation was unsatisfactory and a clear indication that he favored a provision that would include only regular route operators.

2. That the formation of joint boards should be mandatory rather than at the discretion of the State commissions and that where more than three States were involved, applications should be made directly to the Interstate Commerce Commission.

3. That the "grandfather" clause should be effective at a date later than March 3, 1925.

4. That rate regulation be omitted or amended to provide only for the filing of tariffs, that they be adhered to and that they be not changed without notice.

5. That the provision outlining what should be taken into consideration in determining whether or not there is public convenience and necessity for a proposed operation, should be revised.

This is a rather sketchy summarization of Mr. Brown's criticisms, but in making them he went into considerable detail, as the stenographic record of the Washington conference referred to proves. Anyone honestly interested in informing himself, can determine from the record of this conference specifically wherein the Denison bill failed to meet what the Chamber considers to be a proper translation of the principle of Federal regulation into legislation; also what changes would have to be made in it to meet the Chamber's ideas.

Subsequently the various organizations supporting the Parker bill went into a series of conferences. The N.A.C.C. was informed that these conferences were taking place and, we understand, was assured that it would be invited to sit in before action was taken. Actually, however, the Chamber was not invited to participate in these conferences.

Charge May be Unfair

Is it fair therefore to charge that the Chamber held itself aloof from the preliminaries leading up to the introduction of the Parker bill or that its objections were an unexpected, last-minute surprise?

Now let's take up the Parker bill itself. Admittedly it is an outgrowth of the Denison bill, which in turn was a development of the Cummins bill, a brain-child of the public utility commissioners' association.

The Parker bill presumably represented a compromise of the viewpoints of the various interests supporting it. The definition of those who were to be regulated differed from the Denison bill but the language used was such that probably no feature of the bill came in for so much questioning from the members of the Congressional committee as did this provision. There was no change in the administrative machinery; the formation of joint boards was not made mandatory. The effective date of the "grandfather" clause was moved up but a showing of bona fide operation prior to the effective date was made prima facie evidence only, whereas in the Denison bill operators were entitled to a certificate on such showing. No changes were made in the rate regulation features, except that the provision for the suspension of protested rates pending decision by the regulatory authority was eliminated. A new statement of what the regulatory authority should consider in determining whether public convenience and necessity warranted the granting of a certificate was written into the Parker bill but its conditions were no nearer the N.A.C.C. viewpoint than the language used in the Denison bill. If anything, the Parker bill probably was more objectionable in this respect than the Denison proposal.

Opinion will vary as to whether these changes made the Parker bill more acceptable than the Denison proposal from the standpoint of protecting the interests of the public and of the bus operators. After the criticisms the Chamber made of the Denison bill, however, it was inevitable that the N.A.C.C. would regard the Parker proposal as unacceptable and it is difficult to conceive how anyone could have expected any other reaction. These same criticisms were repeated at the Congressional hearing on the Parker bill. Perhaps a few quotations from the record of that hearing would tend to clear up some of the uncertainty that seems to exist as to what the Chamber's position is.

OPINION will vary as to whether certain clauses written into the Parker bill made it more acceptable than the Denison proposal from the standpoint of protecting the interests of the public and of the bus operators.

"After the criticisms the N.A.C.C. made of the Denison bill, however, it was inevitable that it would regard the Parker proposal as unacceptable and it is difficult to conceive how anyone could have expected any other reaction."

Page 122, Mr. Brown: "Well, what I have said was, in some detail, that it seemed to me the machinery here provided for separate hearings and separate action, imposed an impossible burden upon this new industry; that it would however, if it were settled . . . if it were felt that it was desirable to reflect the local situation, that the objection which I have made would be met, provided you insited upon a single hearing on a single record. That is to say, if your joint board, instead of being permissive as in the present bill, is mandatory."

Page 120, Mr. Brown: ". . . I propose to make a suggestion to the committee before I have concluded, which on the whole seems to us the wisest in the present situation. It will, however, be a rather substantial variation, rather more than anything which I have up to now suggested, from the frame of the present bill.

". . . In a general way it involves the commitment of the matter to the Interstate Commerce Commission with, however, the direction to the Commission to choose representatives in the various States whose function would be a little like that of the present examiners of the commission, but who, in fact, would have more direct contact with the community and perhaps more knowledge of local practice and things of that sort."

Page 143, Mr. Brown: "For our own part—our own formula, if we were asked to supply a formula—it would be to commit this regulation to the Interstate Commerce Commission, but limit its jurisdiction at the outset to this question of certification. Then, as time and experience served, such other machinery of regu-

lation should be added as conditions appear to warrant. . . . If, however, these other considerations with respect to the local point of view and the like seem to the committee to weigh heavily and be required to be regarded, then we would suggest, recognizing its effect and its complication, the alternative of joint representative boards which I previously discussed."

Page 129, Mr. Brown: "But the industry is pretty new; and the long distance operation, which is beginning to increase, is very new. And that is why we have hoped and do hope . . . that regulation will not go beyond this granting of a certificate of necessity and convenience . . ."

Stop With Certificate

Mr. Johnson: "Stop with the certificate of convenience?"

Mr. Brown: "Stop with the certification; and you will have the right to revoke the certificate as a disciplinary measure."

Page 134, Mr. Brown: "Now, mark you, there is one, just one, specific direction to this board—'and to existing available transportation agencies and service.'

"I am not here to argue, gentlemen, that a board . . . should ignore the fact that there are existing transportation agencies in service. They would not ignore it anyhow, if you told them to. It is one of the factors in the situation.

"But why it is picked out to be the only specific thing that this board is told in words to consider is another matter as to which I have found no satisfactory answer in my thoughts about the matter. We would like to have the motor coach business considered on its own basis. And we would like to have the board look at the situation and ask whether the community proposed to be served wanted some other bus transportation, or if they did want some other bus transportation, we say they ought to have it. . . ."

Mr. Johnson: "Do you have a suggestion to make as to how it should be worded, Mr. Brown?"

Mr. Brown: "I am inclined to think, Mr. Chairman and Mr. Johnson, that I would not attempt to give directions. You will be presented . . . with a draft which we could accept." The reference here is to a draft of a proposed bill which Earl Bagby of the California Transit Co. presented at the hearing and which is incorporated in the record in full.

The "Grandfather Clause"

Page 136, Mr. Brown: "But I do want to devote a word to what they call the 'grandfather clause' . . ."

". . . and I do not like this phrase 'Shall be considered prima facie evidence.' I do not see why an operator who has been operating all this time and is operating at the time of the passage of this bill should not be given a certificate of public necessity and convenience without further proof . . my feeling is that the fact that he is there has proven that he was needed."

The chairman: "There and giving service?"

Mr. Brown: "There and giving service; because you do not last serving the public if you do not give them something they need and want."

The record of the hearing, as the foregoing excerpts indicate, should not leave many doubts as to what the Chamber would consider to be an acceptable regulatory statute. Hence there does not seem to be any basis for the uncertainty as to the Chamber's position which appears to exist in some quarters.

The recent statements of the Chamber's attitude by Mr. Brosseau and Mr. Loomis would seem to indicate that the manufacturers are not disposed to insist that their views be accepted in their entirety. However, no one will ever know how much the Chamber is willing to concede in order to facilitate the passage of legislation until a sincere effort has been made to reach a compromise. No such effort was made during the period in which the Parker bill was formulated by the proponents of the bill.

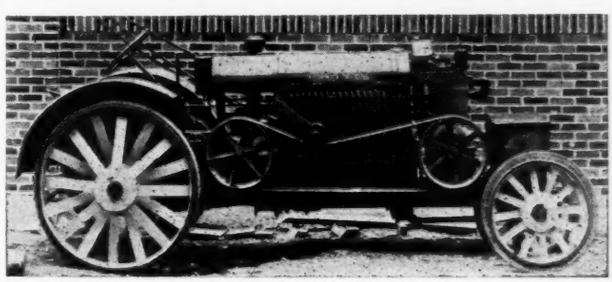
It seems to us difficult to support the charge that the N.A.C.C. opposition was largely responsible for the failure to secure legislation. Undoubtedly the N.A.C.C. objections were factors in preventing action by the House committee on the bill. Even if the bill had been reported out, there are grave doubts as to whether it would have been voted upon, particularly in the Senate. At the end of the last session there was much important legislation to be considered and many political fences to be mended. Under such conditions, any prediction as to what legislation Congress would or would not consider is nothing more than a guess—and a wild one at that.

Framing a Federal regulatory bill is a difficult task and no bill will ever be framed that will be satisfactory to everyone. Three months have passed since the Congressional hearings and little of a constructive nature has been done to reach a compromise between the viewpoints of the proponents of the Parker bill and the N.A.C.C. and representatives of certain operators who appeared in opposition. Filling the air with charges and counter-charges and with challenges isn't producing constructive results.

Self-Propelling Compressor

A SELF-PROPELLING, four-wheel air compressor, capable of handling heavy loads behind itself and of moving about on the job under its own power has been developed by the Pontiac Tractor Co., Pontiac, Mich.

The compressor is a Quincy type W-4 of 124 cu. ft. displacement having a separate radiator with pump driven circulation. The compressor has a three-bearing



Pontiac tractor-driven air compressor

crankshaft and force feed lubrication and is controlled by a Penn unloader with hand unloader attachment.

The compressor unit with air tank and tool box is mounted on a frame which can be attached to either McCormick-Deering or Fordson tractors. Power is taken from the tractor drive.

THE British standing committee on the marking of foreign merchandise, appointed by the Board of Trade, has under consideration the question whether ball and roller bearings imported into Great Britain should bear an indication of their origin.

Savings Effected *by* Closer Study *of* Belting Requirements

Companies which have applied scientific tests to this phase of machine tool drive find it possible in some cases to cut costs in half. Other important data gathered at same time.

By A. F. Denham

IN last week's issue (Aug. 11) there were given the results of an investigation regarding methods of specifying motor sizes for machine tools. It was pointed out that most specifications call for more power than is essential for efficient operation, and that economies in power cost can be affected by closer study of the question of actual power requirements for specific operations on specific tools. In this article the subject is continued with special reference to belting costs, test methods and equipment, machine tool maintenance and time study.

IN the first part of this article, in last week's issue, indications were given of the economies possible through improvement of the power factor by the use of more suitable motor sizes for machine tools.

The machine tool manufacturer can hardly be blamed for specifying motor sizes for his tools which in many cases exceed actual requirements as to rating by considerable percentages. Unless his customer has more accurate knowledge of his requirements it is up to the tool manufacturer to provide assurance that the tool will not break down due to motor trouble under any conditions not too far from those encountered in average operation. An excess of power is therefore necessary from his angle in most cases.

Naturally, the plant engineer or equipment manager in charge of machine tool drives has the same problem to face in attempting to reduce his power costs. Unless he has some means of knowing actual requirements it will be better for him to lean toward the high rather than the low power side. A tie-up in production due to the breaking down of one or two motors might prove quite serious.

A particularly effective method of actually determining power requirements is through the use of portable equipment. In several of the larger plants where the importance of this whole problem is appreciated, rubber-wheeled trucks are used, on which are mounted all necessary instruments, including current transformers, recording watt-meters with variable ratios to take care of any size motor, power factor meters, volt and ampere meters, and sometimes kilowatt-hour meters.

In several of these plants the wiring to each machine tool motor includes plug-in connections for the instruments in the fuse box. This permits making tests on the motor without bridging of fuses, wires, etc., and without shutting down of the motor to be tested. Under these conditions from 1½ to 2 hr. should be sufficient for any test, including a ½-hr. or 1-hr. run on the watt-meter.

The same equipment can be used, and is used, for machine tools in groups driven by belts. For individual tests of belt-driven tools, several plants use a motor unit of large capacity mounted on a movable truck platform or a high lift-truck which can be moved around to any part of the plant and used for test driving of such tools. In this case the instruments are direct-connected to the test motor, provision therefor being made on the motor truck. To run such a test it is necessary only to disconnect the regular belt drive and belt the machine up to the test motor, using the regular or even a different pulley size.

By means of this equipment all necessary data for motorizing machine tools can be obtained, including:

1. Average horsepower during the operating cycle.
2. Maximum horsepower or power peaks.
3. Friction or minimum horsepower.
4. Power factor.

In addition the recording watt-meter charts will supply much other valuable information, including:

a. Power required for cutting at any instant during the machining operation (by subtracting friction from recorded horsepower).

b. The best time-study it is possible to obtain, with the human element removed.

Correcting Tooling Conditions

The information under *a* will serve as a valuable guide for correcting tooling conditions where necessary, and also serve as an indication of the desirability for changing cutting feeds or speeds. In one plant application of data thus obtained resulted in increasing production throughout by from 25 per cent to 33 1/3 per cent without the addition of new machine tools or labor. In another instance production of a group was increased 100 per cent without ill effect on tools.

The value of the information under *b* is self-evident. Since the test chart will, in general, cover at least a half-hour's operation, any operating delays will definitely be shown.

The value of the results of these tests as a basis

for replacing motors by others of more suitable size has been discussed already. While this applies to motors used for direct drive as well as those used for group drive of machine tools, in the latter case there is also an opportunity for effecting radical manufacturing economies.

While the proportion of belt-driven and direct driven machine tools varies in different plants, with the point of view regarding the desirability of each type held by various factory, production, and equipment managers, the cost of belting in most plants represents a considerable sum. In one motor plant, considered among the leaders in efficient production methods, belting costs per year a few years ago were in the neighborhood of 74 cents per unit produced. By the application of test results obtained with the aforementioned equipment, this cost, in less than three years, was reduced to 24 cents per motor, a saving of 50 cents per unit. In fact, although production has been increased considerably in this plant, belting costs are now 50 per cent less than formerly.

In two other plants belting costs were reduced 50 per cent and 75 per cent respectively. In one large corporation of automotive manufacturing concerns belting costs were reduced from $500,000 in 1922 to about half that figure in 1927, although some of this is due to the use of more direct drive tools, offsetting production increases somewhat.

While lack of definite information makes it impossible to determine whether the savings effected in these plants could be duplicated in others, or whether even larger reductions are possible in other plants, there seems to be every reason to suppose that such might be the case. It can probably be safely said that while production executives in the aforementioned plants realized that definite reductions in cost would result from the studies, the final result after correlation of all influencing factors was fairly surprising. It can also probably be safely said that systematic attention will reduce belting costs at the very least about 25 per cent.

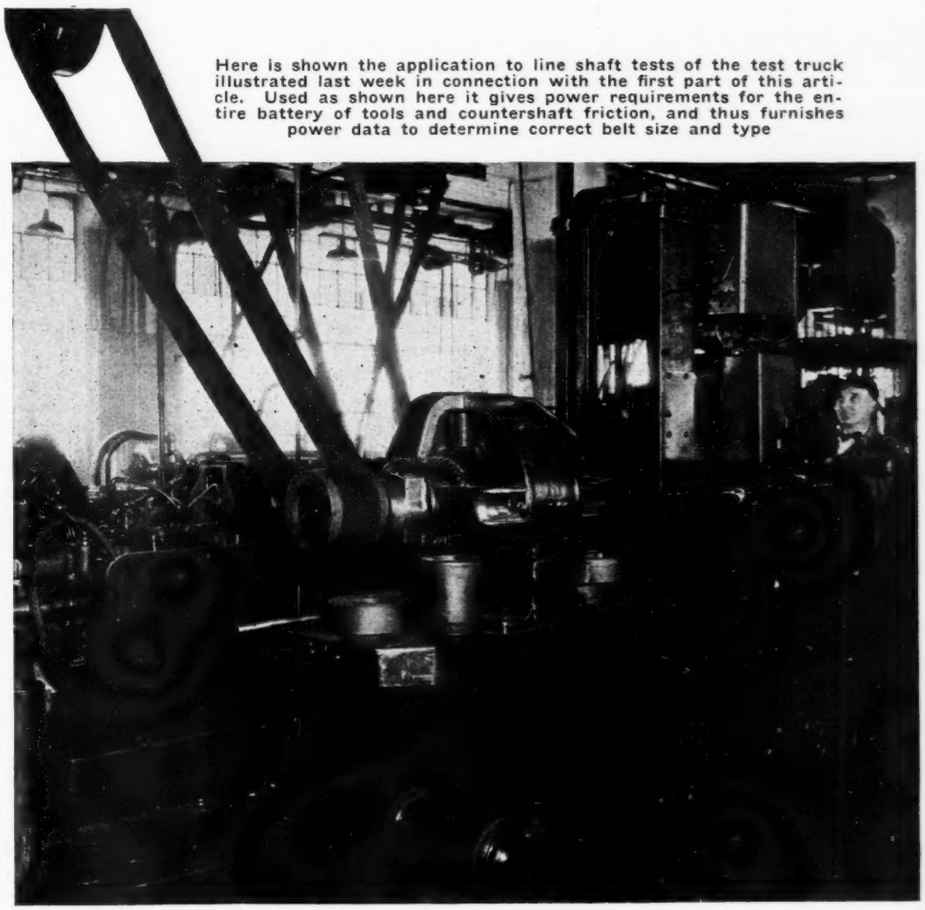
As in most plants, those referred to kept records of their belting installations and as a result it has been generally felt that sufficient data was available from these records to show whether a certain belt was likely to provide good service on any general machine tool in operation. The same conditions exist in most other plants in the automotive industry today. The data are safe enough, as far as maintaining operation is concerned, since here also, as in the motorizing end, the tendency has been to lean toward the safe side, both by the belting manufacturer and salesman and the millwright or factory official in charge of belting installations.

As in the case in motors, a minimum of shut-downs due to belting troubles results from such a course. Following the analogy out further, the power factor of the motor has its equivalent in the additional cost of the excesses reliability obtained by the use of belts larger or more expensive than the minimum requirement for satisfactory service over a given production period.

Moreover, the overpowering of machine tools also has a distinct bearing on belting costs. Without definite knowledge of actual power consumption characteristics of any specific operation on a given machine tool, the natural course was to base the belting size on the motor size. If a 30 hp. motor was used to drive a countershaft to which six machine tools were belted, each would be driven by a belt designed for upward of a 5 hp. load, whether or not this figure was ever reached.

Belting formulas are also open to the same objection as those which are used for determining motor sizes. At best they serve only as a rough indication. "Standard" belting formulas in general are practically useless as accurate universal guides since the assumptions necessary in their evolution do not always correspond to actual operating conditions. Most belting formulas, moreover, lean toward the provision of a considerably longer span of service life than is requisite in the automotive manufacturing industry, with its constant shifting of machine tools and their fairly rapid obsolescence. To this may be added modern developments in belting treatment which vitally effect the formulas and make any general rule difficult of application.

However, let us assume that it is definitely known with reasonable accuracy that a certain belt will



Here is shown the application to line shaft tests of the test truck illustrated last week in connection with the first part of this article. Used as shown here it gives power requirements for the entire battery of tools and countershaft friction, and thus furnishes power data to determine correct belt size and type

transmit a certain amount of power at a definite tension for the most economical length of life with respect to original and depreciation costs, and minimum shutdowns due to belting troubles. Such data can be obtained with fairly reasonable accuracy under actual test conditions. Is this knowledge sufficient without reference to actual power consumption?

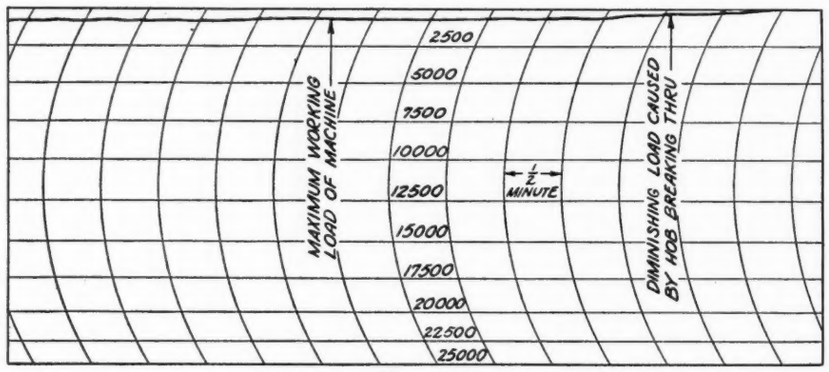
Chart 1 represents, for example, operating conditions for a hobbing machine as recorded on a watt-meter. The machine in question was belted to a countershaft with a 5-in. belt. A number of these tools were in use, and the purchase of three more was contemplated. The chart showed that the power requirement for this tool was very low and a fabric belt or light leather belt was ample to take care of its drive. Two-inch belts were substituted as a result of this test, and have been very satisfactory in service.

Chart No. 2 shows the power curve of an automatic lathe rated at 5-7½ hp. and belted up accordingly. The chart shows that the operation had a power peak barely in excess of 1250 watts, or 1½ hp., and that this peak was but a little higher than that required for indexing, and of a fairly constant nature. Naturally, a lighter belt was substituted.

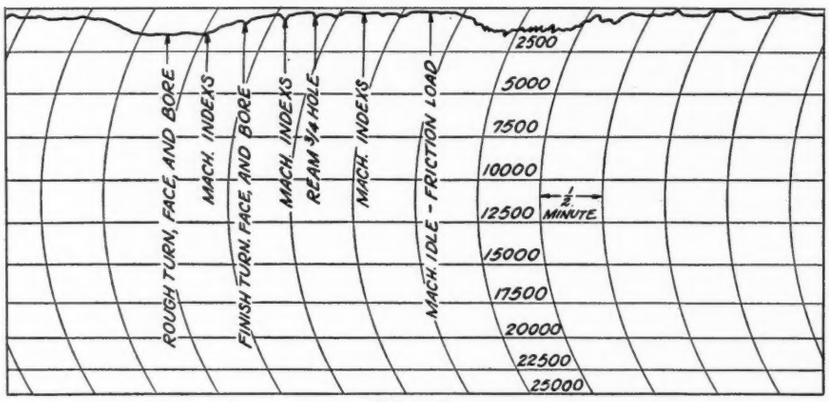
Taking the opposite condition, Chart No. 3 shows the power consumption curve for an automatic lathe used for camshaft machining. Calculations had shown that the power requirements for this tool during the machining operation were not in excess of 7500 watts. Considerable trouble from belt slippage was experienced, however. The chart showed that the frequent peaks occasioned by high power absorption due to clutching was responsible.

Chart No. 4 shows the conditions for a hand feed press rated at 25 hp. and belted to a countershaft. The chart shows that only half of this power is used even at peak load, and that a

THESE sample watt-meter charts are given here not as specific examples of corrective work necessary, but to show how they can be analyzed with reference to horsepower requirements, time-study, tool conditions, friction loads, etc. No. 1 shows a typical gear hobber, No. 2 a low power automatic lathe, No. 3 a large size automatic lathe, and No. 4 a punch press rated at 25 hp.



No. 1



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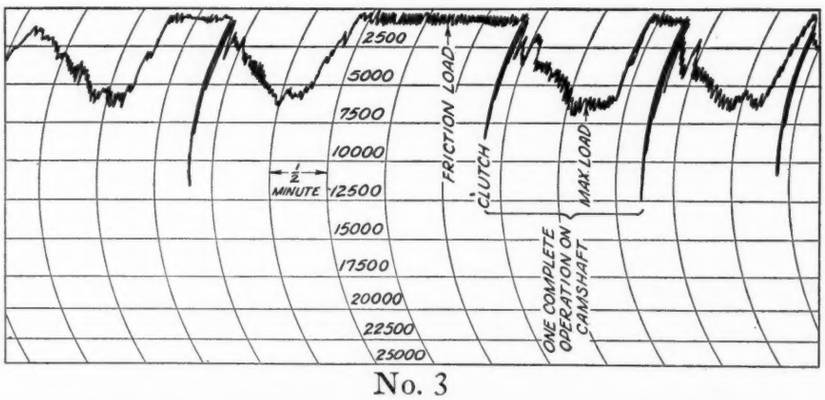
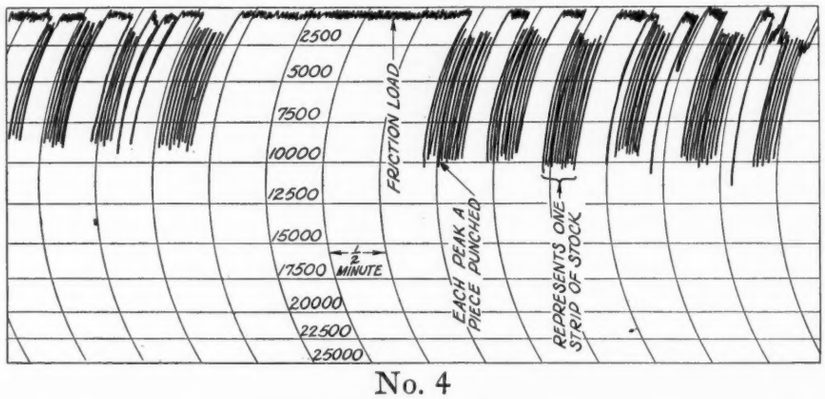


No. 3



No. 4

very much lighter belt than that indicated by the tool rating will do the work.

Again these charts serve as a good indication of the best method of drive. Machine tools which do not vary much in their load, such as shown in Charts Nos. 1 and 2, could be efficiently driven by individual motors of a rating very close to the maximum horsepower actually consumed. This would enable the maintenance of a very good power factor. Variable-demand tools, on the other hand, could be grouped on one motor, assuming, of course, that the peaks would not all occur at the same time, thus obviating the alternatives of providing individual motors which are either subject to frequent heavy overloads, or of such a rating as to be operating at a low average power factor.

Idling Period is Found

Turning to the naturally associated availability of time-study data, it will be noted, for instance, in Chart No. 3 that there is a considerable idling period as shown by the machine operating at friction load. Investigation showed that this was due to the fact that the operator had to remove a truck which carried the strips of stock, and wheel another truck into place. A little study of the specific material-handling problem in this case materially reduced the idling time of the machine.

When to this data are added data on incorrect tooling conditions, improper feeds and speeds, lineshaft friction, belt slippage, etc., all of which would be clearly indicated by recording watt-meter charts, it would seem desirable to have the test results made available to the various departments concerned. In fact, in one or two plants where such tests are periodically conducted, the work is in the hands of a transmission engineer who cooperates with the time-study department, the tool room superintendent, the plant engineer, and the standards departments. Belting repairmen or millwrights and electricians are placed under his jurisdiction.

As additional indication of the possibilities, there might be mentioned the experience of the largest manufacturer of automobiles in a certain mid-European country who has, through similar investigations, been able to reduce by 23 per cent the time lost due to incorrect belting applications, which formerly represented in one department alone an average of 69 hours lost daily.

One more comment from one of the largest machine tool manufacturers might be added, as it has a definite bearing on the subject of reducing power transmission costs. "The difficulty in motorizing machine tools," he states, "has been due to the fact that each motor manufacturer has different sizes, and there has been no standardization. We are in hopes, with the efforts now under way, that the electrical manufacturers will get together and standardize the main essential dimensions, which will simplify the problem for the machine tool builder and also simplify the replacement of motors by the automotive users of machine tools."

(Author's Note—Acknowledgment for his assistance in the gathering of material for this article is due to W. W. Nichols, vice-president, D. P. Brown and Co., chairman of the special Research Committee on Cutting of Metals of the A.S.M.E., member of the Committee on Safety and Production of the American Engineering Council and the Production Committee of the S.A.E., and vice-president of the Society of Industrial Engineers; also to a number of executives of automobile manufacturing companies.)

New Records Set in Small Car Class

FINISHED too late to take part in the Indianapolis 500-mile race, the two-stroke racing car built by the Cozette Carburetor Co. for Prince Ghica has successfully tackled world's records in the 67 cu. in. class. In designing this car, provision was made for fitting two engines, one of 91½ cu. in. piston displacement and the other of 67, the two being exactly alike with the exception of the cylinder bore. The smaller engine was used for the record attempts, but it is stated that the car will be sent to the United States later with the 91½ cu. in. engine.

While the engine is distinctive, Rene Cozette, the designer of the car, has paid a lot of attention to weight reduction and lessened head resistance. He has succeeded in getting the weight of the car below that required under international racing rules and is obliged to use heavy gage sheet steel where lighter material would have been sufficient. The total height of the car is 39 in., with a clearance of 7 in. In order to seat the driver as low as possible, an indirect final drive is used, this consisting of a spur pinion on the propeller shaft engaging with a spur pinion on the bevel driveshaft. This does not give a supplementary reduction, but is only made use of to incline the shaft and place the driver much lower than would be possible with a pair of bevel gears only.

The body is of oval section, only the hand brake lever being external. Both front and rear axles are incased with aluminum housings having an airplane wing section.

The engine is a double-piston four-cylinder supercharged two-stroke on which Cozette has been working for two or three years. Cylinders and crankcase are a single casting in Alpax metal, with iron liners set into the cylinder barrels. There are two crankshafts, one above and one below, united by spur pinions and each one carried in five bearings, the three intermediate ones being plain and the two outer ones radial ball. The upper pistons uncover the intake ports, which are on one side of the engine only, and the lower pistons uncover the exhaust ports, which are on both sides of the engine. In order to allow the exhaust to escape before the fresh charge is admitted, the crankshafts are offset 30 deg. in relation to one another.

The compressor, which is a Cozette, is mounted vertically at the front of the engine and driven by bevel gearing from the lower crankshaft. The volumetric compression ratio is 5.7. Two magnetos are used, these being mounted on a platform at the rear of the engine and driven from the upper crankshaft. Spark plugs are mounted horizontally on both sides of the engine. Lubrication is of the dry sump type, with the use of a feed and a scavenger pump, the oil being passed through a radiator in the nose of the machine. The power developed by this engine is stated to be 130 at 5000 r.p.m. The weight of the engine, clutch and transmission is 360 lb., this including 44 lb. for the magnetos and 33 lb. for the compressor.

The first time on the track the car broke eight world's records for the 67 cu. in racing class, these being 50 kilometres, 50 miles, 100 kilometres, 100 miles, 1 hour, 5 kilometres, 5 miles and 10 kilometres. The highest speed attained was 110.9 m.p.h. for the distance of 5 kilometres. Ghica drove 103.24 miles in the hour.

Past Production *Figures* Indicate *Industry's* Future Growth

Automobiles now closed involved in trend of general business and fluctuations in output can frequently be predicted with considerable accuracy by statistical methods.

By K. W. Stillman

NOW that the automobile industry has had a number of years of steady progress, only slightly affected by extraordinary developments within or without, it is possible to make some statistical forecasts of the future with a little more assurance than was justifiable in the earlier days of extreme fluctuations in the rate of growth.

The course of automobile production, in fact, appears at this time to lend itself admirably to the sort of mathematical study that has of recent years been applied perhaps more widely to other and older industries. Automobiles, it can be shown rather definitely, are now closely involved in the trend of general business, and fluctuations in output can frequently be predicted of statistical methods.

Since the most acceptable criterion of the future is to be found in the records of the past, a representative series of automotive data covering activities in 1919 have been subjected to a statistical analysis to see what might be brought forth.

In Fig. 1 monthly passenger car production figures for the United States have been plotted to semi-logarithmic coordinates in the ordinary manner to visualize the ratio of change. From these figures it is possible to obtain another curve, showing the normal rate of growth from year to year, or "secular trend," and this has been superimposed upon the chart.

The trend, determined by well-known methods, is toward a monthly increment of growth of 1900 cars for the period 1919 to 1927 inclusive. In other words, if there were no other factors influencing production except this element of growth, according to the record of these nine years, the production of each month would have been 1900 units greater than that of the preceding month; the production of any month would have been 12 times 1900 or 22,700 greater than the production one year before; and the total production for any year during the period would have been 12 times 22,700 or 272,400 greater than that of the previous year.

The trend line gives, in any particular year, an idea of the normal expectation of growth in the succeeding year. Beyond that it cannot be regarded as a forecaster, though, as will appear, it has other uses.

For statistical purposes it is necessary to eliminate the element of seasonal variation in production which has so definite an effect upon the monthly production curve in Fig. 1, and also to dispel the influence of the normal growth trend.

Method of Link Relatives

This has been done in Fig. 2. The method of link relatives developed by Prof. Warren M. Persons of the Harvard Graduate School of Business Administration has been used to correct the actual production figures for seasonal variation. The resultant seasonal indexes represent the average production for each month during the period expressed in relation to a hypothetical condition in which production for all months during the year is equal and is equivalent

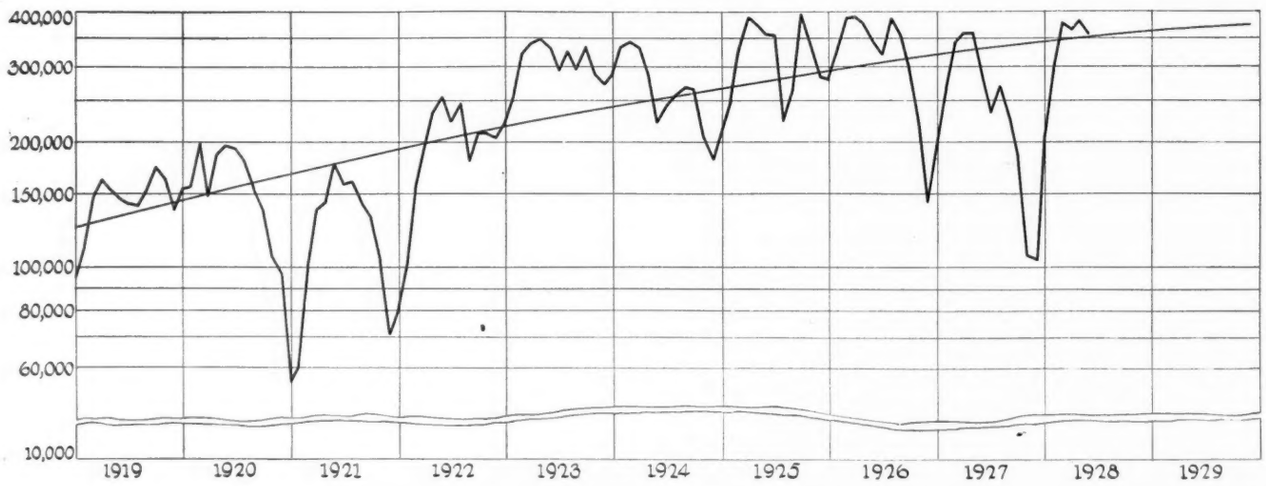


Fig. 1—U. S. passenger car production, 1919 to 1928 inclusive, and "Normal Growth" line for the period

Fig. 2—Per cent deviations from normal corrected for seasonal trend—U. S. passenger car production

to 100. At the same time these seasonal indexes were expressed in terms of percentage of the year's production. Table 1 gives these two items of information.

The actual production figures, then, corrected for both seasonal variation and secular trend to give "Per Cent Deviations From Normal" are shown in Fig. 2. In this curve the line of normal growth shown in Fig. 1 has been brought to the horizontal and all the fluctuations resulting from the seasonal rise and fall of production activity have been eliminated so that the resultant curve shows, in general, how automobile production has been influenced by factors other than seasonal or secular trends.

Plotted Against Annalist Index

Other influences of probably more permanent character are brought out in Fig. 3. Here the corrected automotive curve, further flattened but not substantially altered by the use of standard deviations, is compared with the Annalist index of business activity.

The Annalist Index, published by the New York Times Co., is a rather accurate criterion of general business activity, being a combination of 10 series of data including, besides automobile production, such items as pig iron production, freight car loadings, cotton consumption, electric power production, etc.

The opinion appears to be prevalent that the automotive industry is quite individualistic; that while general business conditions influence it somewhat, internal conditions such as used cars, price cutting, dealer activities and similar factors exercise much greater influence upon the industry's progress.

On the basis of the curves in Fig. 3 this opinion appears to be slightly erroneous. There is almost perfect correlation between the two curves shown there; whenever there is a change in direction of the curve portraying general business there is an identical change, usually, in automobile production. In fact, with two exceptions, there appear to have been during the period surveyed no factors besides general business conditions which have had any major influence on production activities in the automotive industry.

Of the two exceptions, one apparently contradicts a widespread belief throughout the industry that 1924 was a very bad year. From the facts brought out of these curves this year undoubtedly was considerably below the standards set in the previous year, but throughout its duration the activity in the automotive industry was well above that of business in general.

The second exception has to do with a few months in 1925 and the entire year of 1927. When something happens to the productive activity of a single concern which commonly turns out a very large share of all automobiles produced it has considerably more

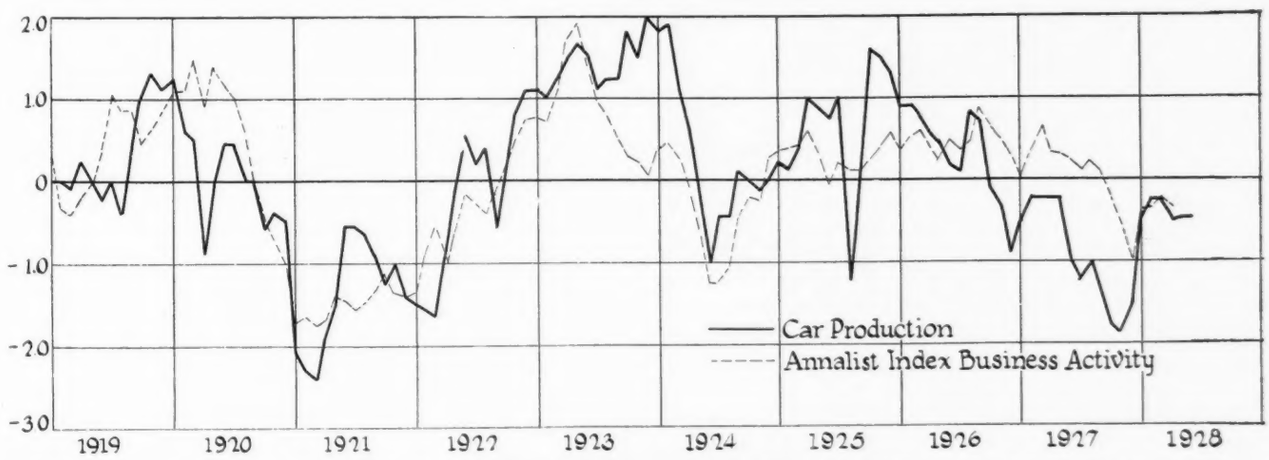


Fig. 3—U. S. passenger car production expressed in terms of one standard deviation compared with the New York Times Annalist Index of general business activity

than local influence. Thus August, 1925, shows a big drop in automobile production followed by excessive output in the succeeding two or three months. With this obvious record can one not reasonably attribute to the same cause a very large part, at least, of the sub-normal production during 1927? Note that now, in the middle of 1928, when Ford output is returning to normal, the automotive curve is once more meeting and even going ahead of the general business curve.

The question might be asked whether these curves are truly representative of automotive activities. They have been so extensively corrected that one is warranted in wondering whether they still are representative of the industry's output.

Five Years' Comparison

In the light of such questions Fig. 4 has been prepared. This shows for five years actual month-by-month and yearly cumulative production compared with computed "normal" output.

An inspection of the month-by-month curves reveals a very close correlation between the actual and normal data. Production has risen and fallen at the same times as might have been anticipated from the normal curves which, as in 1928, could have been constructed long before actual production figures were available.

The main variation between the two curves is in the intensity of their movements, although discrepancies here are not great except in the special instances cited before. There is also a close correlation between these differences and the movement of the general business index curve shown in Fig. 3. Thus, during 1925 actual production was generally above normal and in Fig. 3 one sees that during this year general business activity was also above normal. The same is true of 1926, while during 1924 the automobile business was below its own normal as well as general business.

When the curves shown in Fig. 4 are carried back through the preceding five years the same conditions are shown, a very close relation between actual and normal production with variations between them expressing, in general, the rise and fall of business activities.

Incidentally, the use of curves like those of Fig. 4 afford an excellent method of making definite forecasts. Normal passenger car production for 1928 is shown to be approximately 4,000,000. Modifying this estimate by the trends in general business and, in this particular instance, for the peculiar Ford situation, a forecast for the total production for the year is possible which has somewhat greater accuracy than one based upon hope or intelligent guesses, as the records of past forecasts indicate.

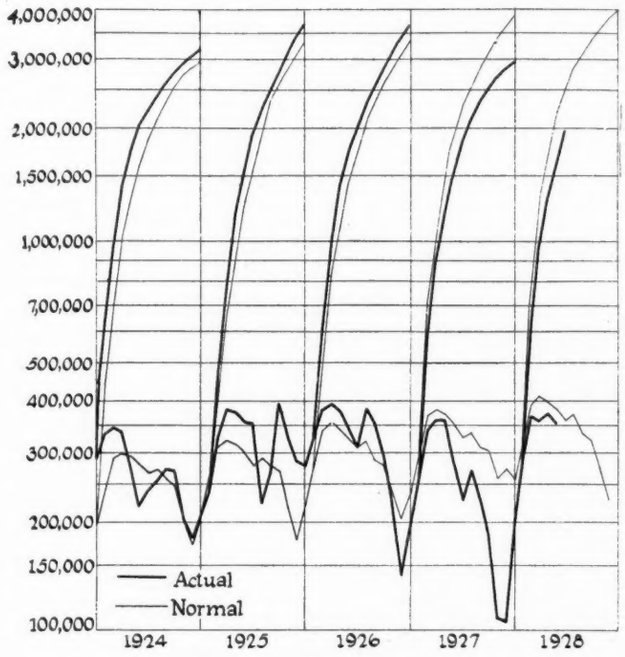


Fig. 4—Month-by-month and year cumulative U. S. passenger car production compared with computed "Normal" production, 1924 to 1928 inclusive

On the basis of the curves, the prediction might be made that if Ford continues to increase his production as is expected and makes up a considerable part of the back-log now present, 1928 will be very close to a normal year and that passenger car production will be fairly close to 4,000,000 vehicles. But general business is somewhat sub-normal, which might be expected to influence the industry unfavorably. The peculiar Ford situation, however, makes it possible for the industry to once more go ahead of general business, in output at least, and reach the normal total of four million.

TABLE 1

Seasonal Indexes—Passenger Car Production (U. S. Only)

	Seasonal Index	Per Cent of Total
January	76	6.3
February	92	7.7
March	116	9.7
April	120	10.0
May	118	9.8
June	113	9.4
July	105	8.8
August	109	9.1
September	101	8.4
October	100	8.3
November	81	6.7
December	69	5.8
	1200	100.0

TO minimize French road accidents, Government orders have been given that all hedges must be kept down to a height of 3 ft. over a length of about 50 yds., at cross roads, grade crossings and other danger points in France. It is certain that this will be effective in reducing accidents, for in districts where no hedges exist the number of mishaps is less than elsewhere. In the meantime the Government is studying other proposals for the reduction of accidents at cross roads.

Road hazards have been reduced by the practice of banking curves and also of placing a high bank of soft earth on the outside of curves. The banking removes all tendency to hug the inside of the curve and the presence of soft earth on the outside generally lessens the amount of damage if a car gets out of control. Where trees line the roads, white bands are being painted round the trunks of those on the outside of bends as a warning to drivers. This is very much more effective than a "go slow" sign, particularly at night and on other occasions when visibility is poor.

Just Among Ourselves

They're All Gluttons for Punishment

RUNNING 30,000 miles at an average speed in excess of 68 m.p.h., as two Studebaker roadsters did last week, certainly is a grueling ordeal for any automobile and serves to illustrate vividly the degree of sturdiness, reliability and performance capable of being built into modern motor cars. Having spent a few hours watching the cars just before the finish, however, and slapping at the Jersey flies which run the famous Jersey mosquitoes a close race for the nuisance championship, we are constrained to state our opinion that the men who supervise these trials, the drivers and the mechanics, all go through a grueling at least equal to that imposed on the cars. Nevertheless, Harry E. Jordan, who was in charge of the Studebaker crews at the Amatol run, insists that the hum of a good motor is sweeter music than any that can be made by the New York Symphony Orchestra, so guess we can only fall back on the old statement that concerning tastes there can be no disputing.

* * *

Financial Statements and the Human Element

THE current financial position and past earnings of a company usually are given about 90 per cent of the total consideration when estimates about that company's future are being made. This is natural, because specific statistical information is available on these points and something tangible is thus present for analysis. Yet it does seem doubtful whether or not these very tangible factors do play so emphatic a part in determining the future trend of an organization's progress. So far as they reflect the activities of a given management still in control, their value as barometers of the future is considerable. The management factor, however, probably is the most important one to be considered. Good management frequently has made a success with relatively small capital in the automotive field, while poor management with huge reserves has often failed.

* * *

Importance Stressed in Raskob Article

THIS view of the importance of management is tersely expressed by John J. Raskob in a recent magazine article when he says: "The roster of the assets of a corporation may be impressive but they are only liabilities without alert management. From a broad social point of view, large amounts of capital in the hands of other than alert men may be a menace If the owners of the capital be widely distributed, with the managers also in the position of proprietors in the degree of their importance in the direction, then the larger the accumulation of capital, the greater will be the social benefit. The welfare of an executive, therefore, ought to be bound up with the corporation which he helps to manage."

* * *

An Arab Chieftain Has Executive Problems

BELATEDLY, we are in the midst of reading Lawrence's "Revolt in the Desert" and thus far aren't nearly so strongly impressed with it as most of our friends seem to have been. One comment made anent Feisal, the head of the native movement, however, caught our fancy strongly. In his task of combining the various tribes, bringing together enemy clans under his single banner and composing radical differences among the tribes, Feisal had a job in human relations second to none in industry. Concerning Feisal's methods, Lawrence says among other things: "He never gave a partial decision, *nor a decision so impracticably just that it must lead to disorder.*" The italics are ours. Strict justice in itself is no easy thing to determine and mete out; the executive who can do that alone is among the Samuri of his kind. But the executive who day after day can handle the multitudinous human problems which come to him so that, not only is justice done, but also those to whom it is meted out are left with the spirit, the will and the desire to carry on their work vigorously and actively—that executive surely must rate a place in the championship flight. Even the Inquisition frequently was just according to its own standards.

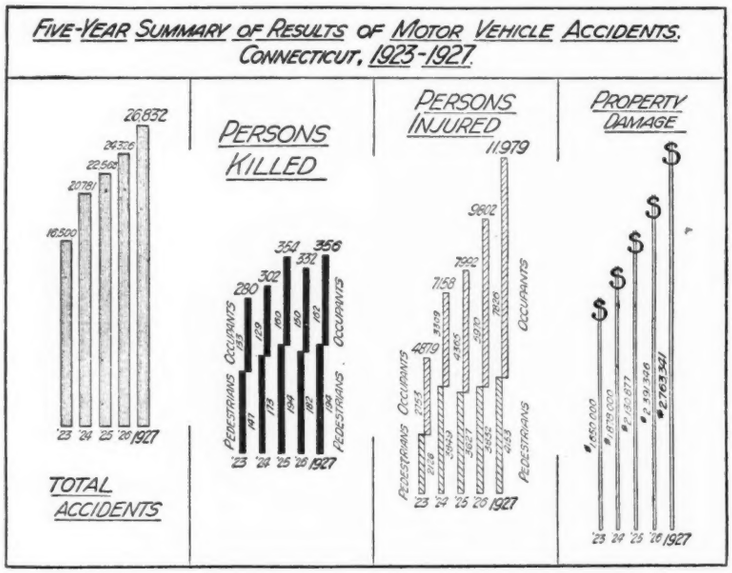
* * *

Napoleon's Coaches in Fisher Emblem

JUST learned the origin of the Napoleonic coach which appears over the words "Body by Fisher" in the advertising of the Fisher Body Corp. Its design is based in that of the "Sacred Coach," an extremely ornate vehicle, said to have cost more than $200,000, in which Napoleon rode to his coronation. Since this particular coach was considered too elaborate to use without eliminating some of the details, some of the lines of "La Topaze," the carriage in which Napoleon and Marie-Louise went to their marriage, also were embodied in the Fisher nameplate design. "In the Fisher silhouette emblem," "Facts about a Famous Family" explains, "there was no attempt made to duplicate the ornate carvings of the Napoleonic carriages, as this would have defeated the wish to have the symbol practical."—N.G.S.

Driver Education Held Only Remedy for Rising Accident *Rate*

Study of motor vehicle casualties in Connecticut during 1927 shows increase of 10 per cent over preceding year.



ANOTHER of the annual studies of motor vehicle accidents in Connecticut by Prof. Richard Shelton Kirby, this one covering the year 1927, has just been published and shows an increase in the accident frequency rate for which, in the opinion of Robbins B. Stoeckel, state commissioner of motor vehicles, education is the only solution.

Mr. Stoeckel expresses himself thus in the introduction, after stating that "there is a lack of fitness on the part of a large enough number of traffic participants to make the whole proposition of automobile operation hazardous to a degree which probably does not exist in any other transportation activity." In pointing to education as the only solution, he says: "This means education to the point of attainment of correct thought to meet each situation as it arises and to anticipate avoidable dangers; in short, acquired knowledge plus foresight. Possibly, in the course of one or more generations, when education can be accomplished approximately to such a degree that every driver knows what is expected of him and what he may expect of others, and as a result of his common sense becomes able to apply his knowledge, then, if he is well intentioned enough actually to carry on, the only danger from motor vehicle operation will be that caused by motor vehicle criminals."

This is the fourth study of Connecticut statistics that has been made by Professor Kirby and while it follows generally the same line as previous studies, several new sets of facts have been introduced. There is, for instance, a study showing the distribution of accidents per day throughout the year. The fewest accidents for any one day—20—were recorded on Jan. 16, while the high mark of 241 was established on July 4.

Another new feature of a comparison of Connecticut death rates with those of three adjoining states—New York, Rhode Island and Massachusetts. It was found that in Connecticut, during 1927, 22.4 persons per every 100,000 population lost their lives in motor vehicle accidents. In New York the rate was 21.2; Rhode Island, 17.5, and Massachusetts, 16.3. Attention is called to the fact, however, that there is a lack of uniformity between the states in methods of classifying and recording motor vehicle fatalities.

The total number of accidents recorded in the state during the year was 26,832, representing an increase of slightly more than 10 per cent over 1926. Persons injured numbered 11,979 as compared to 9802 in 1926; 356 deaths occurred as against 332 in the preceding year, and the property damage resulting from the accidents is estimated at $2,763,341, this being equivalent, Professor Kirby points out, to the original cost of 3500 new automobiles, "which would, if parked closely in a single line, extend some 13 miles." Estimated property damage in 1926 was $2,391,346.

A study of the fatalities by age groups reveals that 32.7 per cent of the victims were over 45 years of age; 30 per cent were between the ages of 5 and 9; 19.6 per cent between 20 and 44; 16.4 per cent between 15 and 19; 15 per cent between 10 and 14, and 10.2 per cent under 5 years.

As in previous years, it was found that the accident rate decreased as the age of the drivers increased. For each 1000 drivers from 18 to 19 years of age there were 245 accidents; in the 20-29-year-old group the rate was 200; in the 30-39-year group, 145; in the 40-49-year group, 100; in the 50-59 year group, 70; in the 60-69-year group, 65, and in the group over 70 years of age, 60.

It should be a matter of satisfaction to automotive manufacturers that only 3.5 per cent of the 1927 accidents could be attributed to defective equipment. Miscellaneous failures head the list, with defective steering apparatus second and brakes third. Blowouts, insufficient light and glaring headlights followed in the order named.

Motor vehicle operators are held responsible for 75.8 per cent of the accidents and pedestrians are blamed for 10.8 per cent. Motormen, bicyclists, unknown operators, animals, etc., are found at fault

in 7.5 per cent of the cases. Failure to grant right of way caused 16.8 per cent of the mishaps attributed to operators; 18.7 per cent were due to inattention; 16 per cent resulted from miscalculation, and 8.6 per cent were caused by skidding. The majority of accidents to pedestrians occurred at street crossings.

An unusually high accident rate is shown for buses and taxicabs as compared to other types of vehicles. There were more bus and "jitney" accidents recorded than there were vehicles registered in this classification, the rate being 1070 accidents per 1000 registrations during the year. For every 1000 taxicabs there were 348 accidents; commercial vehicles, 172; private passenger cars, 147; motorcycles, 126, and miscellaneous, 47.

In a study of the 7525 accidents in which commercial vehicles were involved, it was found that in 4915 cases the driver of the commercial vehicle was at fault; in the other 2610 cases the commercial vehicle driver was not at fault. In the great majority of cases the vehicle was being driven by an employee of the owner or owners of the vehicle.

Parts Warehousing

(Continued from page 219)

by employees, two by manufacturers' agents and three by commercial warehouses.

Ten companies make no charge for shipment from warehouse; five add freight or a price charge; another company adds a straight price charge of 5 per cent; three companies add freight from factory to warehouse.

Commenting upon the advantages and disadvantages of warehouse practice, the M. & A.M.A. report says:

Advantages and disadvantages of warehouse distribution, according to comments of parts manufacturers principally, but to an extent of accessory and service equipment makers, may be summarized as follows:

Advantages

1. Warehouses enable the manufacturer to obtain business from the smaller jobbers with limited capital.

2. Warehouses reduce the manufacturer's risk on account of wholesalers' smaller purchases and inventories.

3. Warehouses assist jobbers, particularly in slower-moving lines, in increasing turnover and reducing losses from obsolescence.

4. Warehouses enable the manufacturer of the more bulky products to take advantage of carload shipments, thus reducing freight costs.

Disadvantages

1. Warehouses increase the manufacturer's sales expense, not only in the cost of operating the warehouse but in handling smaller and more frequent invoices.

2. Warehouses tempt the jobber to take advantage of the manufacturer, picking up small lots of fast-moving as well as slow-moving items instead of keeping the former in stock.

3. Warehouses threaten demoralization of distribution through wholesalers, who normally should be expected to exercise the functions of financing, selling and warehousing.

4. Warehouses encourage expansion of wholesale outlets, which some manufacturers believe has already gone too far for the good of the industry.

Makers of so-called standard products which include a limited number of sizes or styles and which are not subject to much change from year to year, have not adopted the warehouse practice to any extent. Most of these have been able to get reasonably adequate distribution of stocks in the hands of their wholesale distributors. Most of the warehousing has been undertaken by manufacturers whose products, such as mechanical parts, are subject to frequent change because of changes in the design of cars and trucks. These manufacturers have largely established warehouses to supply the needs of the trade for semi-obsolete or slow-moving parts. Some have been able to hold their warehouse shipments to such parts by means of substantial service charges for shipments from warehouses of the fast-moving items. Others have found their wholesalers drawing increasingly larger percentages of their fast-moving parts purchases from nearby warehouse stocks instead of from the factory, with the result that sales costs have gone up without a compensating increase in volume.

A recent investigation by *Motor World Wholesale* covering the experiences and opinions of 298 wholesalers including 106 A.E.A. wholesalers, 100 service parts wholesalers, and 92 other wholesalers shows that a large majority of wholesalers draw some of their merchandise from manufacturers' warehouse stocks and favor the location of such stocks in their territory. It is significant, however, that quite a few wholesalers, ranging from 25 per cent to 31 per cent in different groups, were opposed to the establishment of warehouse stocks by manufacturers.

Among those who favored the establishment of warehouse stocks, quick delivery service was the principal reason given. Several wholesalers stated that warehouse stocks helped them to get better stock turn and reduce their own stock investment, while a few others gave reduced transportation costs as a reason for favoring warehouse stocks.

Several wholesalers opposed warehouse stocks because they thought that the jobber's stock should be a warehouse stock and that he should be capable of serving the trade. A few wholesalers expressed the belief that the establishment of warehause stocks by manufacturers was an excuse for selling direct to retailers.

Men who are making a study of all phases of distribution are quite unanimous in the opinion that, except in a few cases of manufacturers who have greatly diversified lines, the cost of adequately serving the retail trade through a net-work of factory owned warehouses would be prohibitively high. The wholesaler stocking a comparatively wide range of merchandise and spreading the cost of warehousing and selling thinly over all of them is still, by far, the most economical form of contact with the retailer for the manufacturer. Other reasons given by wholesalers for opposing warehouse stocks were as follows: It limits the activities of the large wholesaler and burdens him with an extra cost; warehouses are not able to serve as wholesalers in estimating the sale for a given article. One wholesaler objected to the cost of maintaining warehouse stocks.

A tabulation of the results of the *Motor World Wholesale* investigation of the experiences and opinions of 298 representative wholesalers accompanies this article.

Aluminum-Coated Duralumin Proves Durable Aircraft Material

Stands up especially well against corrosion in salt spray test after anodic oxidation treatment. Resistance to elements high even when surface is scratched.

By T. W. Downes
Metallurgist, Naval Aircraft Factory

OF foremost importance among the requisites of sheet metal for use in aircraft construction are great strength with reasonably high elongation as indicated by the static tension test; good fabricating qualities; low specific gravity, and ability to withstand attack by the natural corrosive agents encountered in service.

A number of metals and alloys are possessed of three of these four properties to a very satisfactory degree, but are in one or more other respects below par, so that up to the present time no single metal or alloy has been produced which has every desirable property.

Duralumin and several other strong, wrought aluminum alloys are excellent materials with the exception only of their susceptibility to corrosion, and to correct for this deficiency by the application of efficient corrosion-resistant coatings is the equivalent of an increase in the specific gravity of the alloy. Aluminum has the disadvantage of inferior strength and stiffness. The bronzes and stainless irons are open to objection because of their weight, and, in some cases, unsatisfactory fabricating qualities. And so, throughout the entire category of metals and alloys, there is none to which there is not some reasonable objection.

The excellent resistance of pure aluminum to corrosion and its pronounced electro-positive relation to most other metals, also the good mechanical and other properties of some of the aluminum-base wrought alloys which are benefited by heat-treatment, have been combined to great advantage in the sheet metals now being marketed under the name of "Alclad."

Thin Aluminum Layer

The exact method of manufacture of these materials is not generally known, but the process employed in their production yields a sheet consisting of a strong aluminum alloy upon the surfaces of which is superimposed a relatively thin layer of aluminum of high purity. These products, having all of the desirable characteristics of the base metal and the corrosion-resistance of aluminum, which latter metal, it should be remembered, is not subject to the particularly dangerous intercrystalline type of corrosion, are without a doubt the nearest approach which has been achieved to the ideal material for all-metal aircraft construction.

The type of Alclad employing duralumin as the base metal and known as Alclad 17S was recently made the subject of a metallurgical investigation of a preliminary nature at the Naval Aircraft Factory to determine principally: (1) its resistance to corrosion by the spray of a 20 per cent salt-water solution in the conditions both as received and after the customary heat-treatment for duralumin; (2) the effect of long exposures at the heat-treatment temperature before quenching upon the mechanical properties after corrosion exposures, and (3) the relationship between the microstructure immediately beneath the surface of the metal and the rate of corrosion.

Mechanical Properties

For use in determining the mechanical properties of Alclad in various conditions, a number of standard tensile test specimens ½ in. wide and 3 in. long were prepared from a sheet of the metal 0.064 in. thick. These were treated in groups as follows:

(a) Not treated. Tested in the "as received" condition.

(b) Annealed at approximately 360 deg. C.

(c) Heated to 500 deg. C., held at this temperature for 30 min., quenched in water at room temperature (70 deg. Fahr.) and aged at room temperature for 10 days.

(d) Same as (c) above, followed by the anodic oxidation treatment.

(e) Heated for 50 hrs. in an electric muffle furnace at 500 deg. C., quenched in water at room temperature and aged at room temperature for 10 days.

Specimens from each group were tested in tension without further treatment. Other specimens from each group were subjected to corrosion by a 20 per cent salt water spray for 30 and 60 days respectively before being tested. Results of all tests are given in Table 1, and for the uncorroded material in the conditions "as received," annealed, and heat-treated as indicated in (c) above, are practically the same as those for duralumin in the corresponding conditions. No pronounced lowering of the properties due to corrosive attack could be detected even though pitting in some cases was severe, so that, except for a slight reduction in the elongation value of the annealed specimens and possibly those heated at 500 deg. C. for 50 hours, these remained unaltered by exposures to the salt water spray for periods up to 60 days.

Two sheets of Alclad approximately 6 by 3 in. were flange-welded together without any difficulty along

the 6-in. edges, using an oxy-acetylene flame, a standard flux and no filler rod. In this type of welding very little filler rod, and often none, is necessary as the flanged-up edges to be joined sufficient metal to form the weld. Other types and conditions of welding were not tried. After welding, the assembly was heat-treated (standard duralumin heat-treatment), and half of its surface, including half of the weld, was anodized preparatory to a corrosion test.

For any who may not be familiar with the anodic treatment, or anodizing, as it is sometimes more briefly termed, it may be well to state here that this is an electrolytic process, successfully applied only to aluminum and aluminum alloys containing not over 5 per cent of copper, in which the part to be treated is made the anode in an electrolyte consisting of a 3 per cent water solution of chromic acid. Briefly, under certain conditions of time, temperature and voltage, the surfaces to be treated acquire a film of aluminum oxide which is very resistant to corrosive attack by fresh or salt moisture, and to which varnishes, paints and other protective coatings of this nature will adhere much more firmly than to the natural surfaces of aluminum, duralumin and other aluminum base alloys.

TABLE I

Mechanical Properties of Alclad 17S Sheet 0.064 in. Thick in Various Conditions, Before and After Salt Water Spray Corrosion Tests

Heat-treatment Received	No.	Yield Point p. s. i.	Ultimate Strength p. s. i.	Per Cent Elong. in 2 in.
None. Condition "As Received."	1	39800	54200	18.8
	2	39200	53500	16.8(?)
	3	40300	55000	18.5
Annealed. Heated for 30 min. at 360 deg. C. and air cooled.	1	19250	38000	20.5
	2	21600	37500	17.0
	3	21250	37600	16.7
Heat-treated. Heated for 30 min. at 500 deg. C., quenched and aged 10 days.	1	31400	54750	19.0
	2	32900	54000	19.0
	3	33900	54600	19.2
Heat-treated as above and subjected to anodic oxidation treatment.	1	32800	53500	19.2
	2	32700	53700	19.3
	3	31900	54600	19.0
Heated for 50 hrs. at 500 deg. C., quenched and aged 10 days.	1	28300 (?)	54400	19.0
	2	33800	54800	18.7
	3	33050	54250	18.3

NOTE: Each value in the above table is the average of two tests.

No. 1—Before corrosion test.
No. 2—After 30 days in salt water spray.
No. 3—After 60 days in salt water spray.

Anodized Specimens Immune

Of the tensile test specimens subjected to the salt spray all showed evidence of corrosive attack except those which had been anodized. Even after the 60-day test there was no visible evidence of corrosion in any form on any of the specimens so treated.

During exposure to the salt water spray, corrosion progressed at apparently the same rate on specimens not heat-treated, annealed, and heat-treated in the manner customary for duralumin, and was plainly visible at the end of about two weeks, being manifested in every case by a fairly uniform roughening of the surface and the presence of a product, which, after drying, assumed the form of a fine, white powder. There was, however, no deep pitting at the end of 60 days in the spray, the final conditions of all being about the same, namely, a more advanced stage of that obtaining at the end of two weeks.

Corrosions of the specimens heated for 50 hr. at 500 deg. C. before quenching took the form of severe pitting at numerous locations on the surfaces of the specimens. Subsequent examination of the transverse sections of the specimens showed that the deepest of these pits extended entirely through the layer of aluminum, and in some cases into the duralumin, in 60 days. Similar specimens subjected to the anodic oxidation treatment before the corrosion tests were not attacked. This result is indicative of the rust-protecting properties of the layer of aluminum oxide formed by the anodic treatment.

Sixty days in the salt water spray test produced deep pitting along the edges of the weld on the portion of the oxy-acetylene-welded specimen which was not anodized after welding, but the portion of the sheet so treated remained uncorroded at the weld and elsewhere at the end of the test.

A specimen in the "as received" condition, upon the surfaces of which had been made a number of deep scratches before the corrosion test, showed no evidence of accelerated corrosion in the vicinity of the scratches even after 60 days in the salt spray. This is of particular practical value, inasmuch as during the process of manufacture there is considerable likelihood of surfaces of parts becoming more or less abraided. Whether or not such marks rupture the aluminum coating apparently matters little, for in either case protection may be expected, provided large areas of the duralumin are not exposed. The protective action is obviously electrolytic.

Specimens of Alclad in the condition as received, after both the standard duralumin heat-treatment and prolonged heating before quenching, and in these conditions after 60 days in the salt water spray, were polished, suitably etched and examined in cross-section at high magnification for microstructure, measurement of the thickness of the aluminum coating, and extent of corrosive attack. Etching was done with a mixture of three parts glycerine, two parts hydrofluoric acid and one part of nitric acid.

The conditions of transverse sections of specimens in various conditions before and after the corrosion tests are shown in Figs. 1 to 5, inclusive, in all of which the surface of the metal is at the top. The junction of the aluminum and the duralumin, and the thickness of the aluminum are quite apparent in each case and require no explanation.

The aluminum coating of the metal as received was remarkably uniform in thickness, averaging 0.0033 in. or about 5 per cent of the thickness of the sheet. Taking into account both sides of the sheet, the aluminum constituted about 10 per cent of its total thickness.

After Heating at 500 Deg.

Fig. 2 is of the structure after heating at 500 deg. C, for 50 hr., followed by quenching, and shows the diffusion of soluble constituents in the duralumin through the entire thickness of the aluminum coating to its surface. This extreme condition obtained only in the specimens so treated and is undoubtedly responsible for the pronounced attack thereon in the corrosion tests.

The effects of short and prolonged heating periods prior to quenching in heat-treatment on the attitude of the metal toward corrosion in the salt spray are shown in Figs. 4 and 5 respectively. In Fig. 4 there is distinct evidence of incipient migration of constit-

Fig. 1—"Alclad" as received. Etched. X100

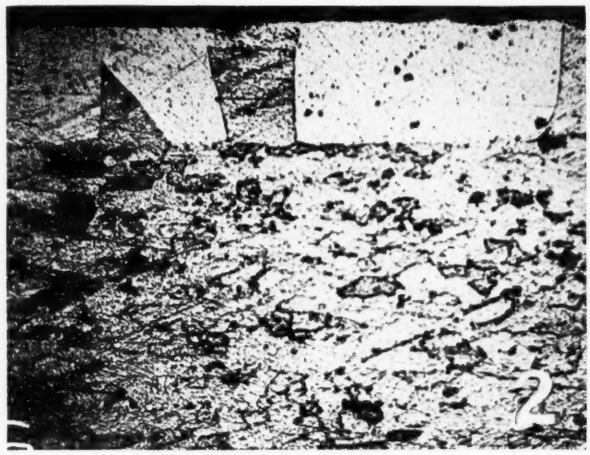


Fig. 2—"Alclad" heat-treated (50-hr. treatment) at 500 deg. c. Etched. X200

uents, but because of the slight extent of this action, corrosion progressed at a much less rapid rate than on the specimen of Fig. 5, which was heated for 50 hr. at 500 deg. C., and in which diffusion undoubtedly reached the surface. In the latter specimen corrosion entirely removed the layer of aluminum and penetrated the duralumin in places. Even in this condition, however, the metal is undoubtedly markedly superior to normal duralumin sheet in resistance to corrosion.

Rate Would be Accelerated

The fact that about one-third of the thickness of the aluminum coating of the normally heat-treated metal (Fig. 4) was removed by exposure of 60 days in the salt spray should not be interpreted to mean that 180 days would be required for its complete removal. Partial diffusion was noted in specimens so treated, and it is to be expected that the rate of corrosion would be materially accelerated when the point in the aluminum is reached to which diffusion extended.

As would logically be expected, in view of the fact that the transverse section of the material tested consisted of approximately 90 per cent duralumin and 10 per cent aluminum, its mechanical properties were nearly the same as those of duralumin. It is noteworthy, however, that these properties were not seriously impaired by the severe corrosion tests in which the aluminum coating was completely removed and the duralumin somewhat attacked in certain places. Reduced elongation after the 60-day corrosion tests would not have been surprising, and might have been attributed to intercrystalline attack. There was no evidence of this form of corrosion, however, in any of the specimens, and it is a question as to whether or not this was obviated by electrolytic action.

It should be remembered that the work of the tests, results of which have been described, was limited to one thickness of sheet and that the properties of the material undoubtedly vary with the thickness thereof. For this reason the following conclusions, which are based on the foregoing test-results, should be regarded as strictly relevant only to Alclad 17S sheet 0.0064 in. thick and not to Alclad material in general.

(a) The mechanical properties of the metal are essentially the same as those of normal 17S (duralumin) sheet similarly treated, namely, approximately as follows:

Condition	Yield Point p. s. i.	Ult. Ten. Str. p. s. i.	Per Cent Elong. in 2 in.
As received	39,000	54,000	18
Heat-treated	31,000	54,000	19
Annealed	19,000	38,000	20

(b) Microscopic examination showed the metal to consist of a core of duralumin sheet having a layer of aluminum of remarkably uniform thickness (0.0033 in.) on both surfaces. The aluminum appeared to be of good quality but no quantitative determination of

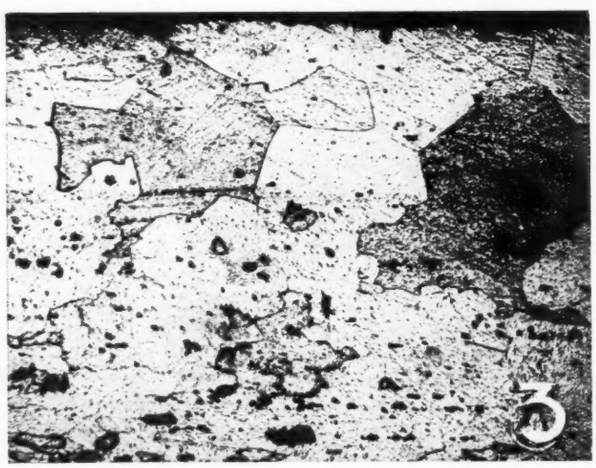


Fig. 3—Same as Fig. 2 but X500

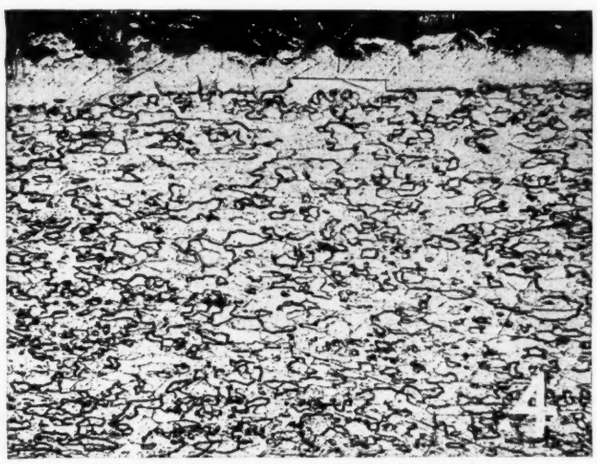


Fig. 4—"Alclad" heat-treated (standard treatment). After 60 days in salt spray. Etched. X100

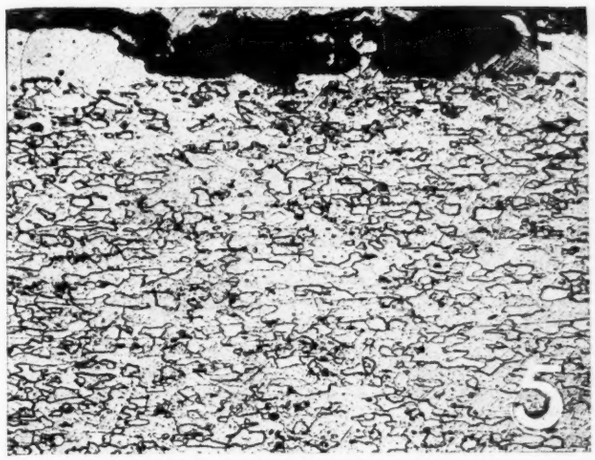


Fig. 5—"Alclad" heat-treated (50-hr. treatment). After 60 days in salt spray. Etched. X100

its purity could be made metallographically. The thickness of 0.0033 in. for the aluminum represents about 5 per cent of the total thickness of the sheet, or about 10 per cent of its thickness when both sides are considered. The bond between the aluminum and duralumin of the metal as received appeared to be good, there being no sharp line to indicate incomplete merging of the two metals.

(c) Heating at 500 deg. C. causes diffusion of certain soluble constituents of the duralumin into the aluminum. The rate of diffusion was not determined, but specimens heated for 30 min. at 500 deg. C. showed pronounced evidence that this phenomenon had begun, and heating for 50 hr. at this temperature caused migration of constitutents through the entire thickness of the aluminum layer to its surface. For this reason repeated heat treatments of Alclad or unduly long exposures of the metal to the temperature of heat-treatment should be avoided.

60-Day Exposure

(d) Specimens of Alclad as received, also annealed and heat-treated according to standard practice for duralumin, showed excellent resistance to corrosion by salt water spray. On specimens exposed to the spray continuously for 60 days corrosion was manifested only by a roughening of the surface accompanied by the usual well-known products of corrosion peculiar to aluminum subjected to salt moisture. Microscopic examination of sections of these specimens showed that an average of possibly one-third of the thickness of the surface layer of aluminum had been removed during the 60-day exposure.

Corrosion of specimens heated for 50 hr. at 500 deg. C. before quenching, however, were much more severely attacked by the salt spray. In 60 days severe pitting was general, and in many places the entire thickness of the aluminum had been eaten away and the underlying duralumin attacked. This increased rate of corrosion is attributed to the contamination of the aluminum by the diffusion of soluble micro-constituents from the duralumin.

(e) The metal may be readily gas-welded by the customary method for aluminum and duralumin, but welds, even after heat-treatment, are much more rapidly attacked in accelerated corrosion tests than the remainder of the sheet.

(f) The anodic oxidation treatment greatly increases the resistance of Alclad to corrosion. Treatment of specimens by this process prevented practically entirely any attack by salt spray in 60 days on specimens heat-treated by both short and long heating periods and on welded specimens.

(g) The surface of Alclad may be quite severely scratched and still apparently retain its normal resistance to corrosion at the abrasions. In such cases where the aluminum coating has been ruptured the absence of corrosion is attributed to electrolytic protection, but where the aluminum is simply pressed inward without actual rupture, protection is effected by exclusion of the corrosion agent from the duralumin.

New British Tractor

AT the recent show of the Royal Agricultural Society in Nottingham, England, there was exhibited a 40 hp. chain tractor by the firm of Clayton & Shuttleworth which is said to have found particular favor with the War Department. It is started on gasoline and normally operated on kerosene. The engine is of the four-cylinder type and develops 47 hp. at 1200 r.p.m.

Tests by an independent authority demonstrated that the maximum draw-bar pull with the engine running on kerosene is 6200 lb. and with gasoline 7250 lb., (at which point adhesion failed). A 6-ton load was hauled up a grade of 18 per cent using gasoline as fuel. The engine speed is controlled by a governor and the clutch is of the single-plate metal-to-Ferodo type. The final drive is effected from the change-speed gear-box to the rear axle through bevel gears and a differential. The rear axles are keyed direct to the main track driving sprocket and intermediate exposed gears are thus eliminated. Steering is effected by two brake drums mounted on opposite sides of the driving gear of the track unit, the braking of one or the other holding that track. This is done by means of the steering wheel. For the purpose of driving stationary machinery the tractor is provided with a pulley of 9-in. diameter, suitable for a 6-in. belt, which runs at the same speed as the engine. The tracks consist of cast steel shoes. Holes are provided in the shoe for the purpose of fitting strakes. The track links are connected by pins of case-hardened steel.

The track plates are supported at top and bottom by means of cast iron rollers running on case-hardened steel pins, for which lubrication is provided by means of screw-down lubricators. The track has a width of 14-in. and a total length of contact of 6 ft. with the ground under normal conditions.

Extension for Scully Reamer

THE Scully Steel & Iron Co., Chicago, Ill., is offering an extension for use with the Scully JMC expansion reamer. This is known as the JMC king bolt pilot. It converts the piston pin-type JMC reamer into a steering knuckle-type. In many cases the JMC reamer can be used for reaming the bushings in water pumps, transmission gears and other places where the distance between the two bushings is considerable.

One size king bolt pilot will fit several sizes of JMC reamers; in fact, only four sizes are required to fit all sizes from 0.605 to 0.999 in, having a total range of from 0.595 to 1.031 in. The regular taper pilot bushings (or guides) as used with the piston pin type are used with the king bolt pilot to center the reamer and to insure reaming holes in line.

First with the News

Reliable and Accurate

News of the Industry

PAGE 242. VOLUME 59 *Philadelphia, Saturday, August 18, 1928* NUMBER 7

Factory Operations Exceed 1927 Rate by 25 Per Cent

PHILADELPHIA, Aug. 18—Production of passenger cars and trucks in July in the United States and Canada approximated 422,000, bringing the total for the first seven months to about 2,750,000. Production in July last year totaled 279,456 and the first seven months totaled 2,475,150. In 1926, the industry's record year, July output totaled 374,483 and the first seven months 2,857,936.

Production in August is running about 25 per cent higher than in the same month last year, a rate that unquestionably will be continued through the month. Factories which have recently introduced new models are in several instances more than a month behind on deliveries and increasing operations during the month will serve only to reduce the number of orders carried into September. The Ford company, now building about 4000 cars daily, is still months behind orders.

Reports from the field indicate generally low dealer stocks of both new and used cars. The new car situation is materially helped by the fact that dealers handling cars recently introduced, and Ford dealers, have no cars at all and are receiving only allotments from factories. Used car stocks are being kept low by active demand in practically all centers.

Republic Buys Steel & Tube

CLEVELAND, Aug. 15—Republic Iron & Steel Co. announced today the purchase of Steel & Tube, Inc., at an estimated price of $17,000,000. E. T. McLeary, president of Republic, said the purchase would be handled through an exchange of securities.

Change Subsidiary Name

EVANSVILLE, IND., Aug. 14—Motor Bodies, Inc., body building subsidiary of Graham-Paige Motors Corp., filed notice for change of name to the Graham-Paige Body Corp.

Marlin-Rockwell Net $965,806

NEW YORK, Aug. 15—Marlin-Rockwell Corp. earned $2.66 a share in the first half of 1928, against $1.87 a share on a smaller amount of stock outstanding in 1927. Net profit rose to $965,806 from $625,049.

July Rim Production Rises to 2,209,692

CLEVELAND, Aug. 15—Rim production in July totaled 2,209,692 as against 1,679,587 in the same month last year according to report of the Tire & Rim Association of America, Inc. Production in the first seven months of the year has been increased to 15,183,731 as against 13,101,094 in the same period last year. Of the 1928 total, 228,714 were truck rims and 1,974,183 passenger car rims, the remainder of the output being divided between motorcycle and plane rims.

July production in principal sizes for the two years follows:

	1928	1927
18 in. Balloon		
18 x 4	111,778	58,565
19 in. Balloon		
19 x 3½	104,615	52,350
19 x 4	264,014	88,960
20 in. Balloon		
20 x 4	321,396	364,297
20 x 5	144,636	16,924
21 in. Balloon		
21 x 2.75	463,844	.....
21 x 3½	108,763	445,038
29 in. Truck		
30 x 5	143,782	107,863

Kissel to Manufacture for Bradfield Motors

CHICAGO, Aug. 16—Kissel Motor Car Co. has closed a contract to build taxicabs, trucks and buses for the recently formed Bradfield Motors, Inc. The contract is expected to enable the Kissel company to practically double its production. Kissel will build the entire vehicle, including chassis and body. The Bradfield company will not only sell the taxicabs but will take over the sale of Kissel trucks and buses. Final plans are now being completed and production is expected to get under way within 30 days.

New Diesel Engine Designed in Germany

WASHINGTON, Aug. 16—Designed especially for buses, trucks and railway motor cars, a new high-speed Diesel engine is reported perfected by a Breslau, Germany, machinery manufacturer in advices to the Department of Commerce from Trade Commissioner Wallis in Berlin. The new engine uses heavy fuel oil for combustion and is expected to prove successful. Its low weight and high speed rotation is reported to enable it to compete with other types of internal combustion engines of equal power. Danger, due to high speed revolution, is said to be eliminated by specially designed lubrication system.

M. & A.M.A. Survey Shows Warehousing Increasing

NEW YORK, Aug. 15—That the establishment of warehouse stocks at strategic points by manufacturers, the better to serve their wholesale distributors, is on the increase is clearly shown in the survey recently completed by the Motor & Accessory Manufacturers Association.

According to the survey, warehouse stocks are located at 34 cities, the five leading ones being San Francisco, Chicago, New York, Kansas City and Atlanta. Most of the companies maintain only two warehouses, one almost invariably on the Pacific Coast and the other in the Mid-West or on the Atlantic seaboard, depending upon the location of the factory.

Shipments from warehouses average 25 per cent of total sales of companies maintaining this service.

Olds Plant Resumes

LANSING, Aug. 13—The Olds Motor Works resumed manufacturing operations Monday following a week's shutdown to permit employees to enjoy a brief vacation. The factory at present is ahead of all previous full year records. More than 60,000 cars were shipped during the first seven months of the year.

Citroen to Present Six at Paris Show

New Car Selling at $1,250 Also to be Shown in New York

PARIS, Aug. 10 (*by mail*)—Although reserved for the first time to passenger cars, bodies and accessories, to the exclusion of motorcycles, cycles and trucks, the Paris automobile show to be held in the Grand Palais from Oct. 4 to 14 has united 200 more exhibitors than last year, declares Henri Cezanne, show manager.

The United States heads the list of foreign car exhibitors with 28. Italy will have seven representatives; Germany, five; three Belgian; Great Britain, whose show overlaps the Paris exhibition, will be present with only two makes, Austria one, and Czechoslovakia, one.

More Sixes and Eights

Tendencies at the Paris show, as revealed by a preliminary survey, will be an increased number of six and eight-cylinder engines. Among those having adopted the straight eight are Renault, Mercedes-Benz, Unic and De Dion Bouton. New sixes will be produced by Citroen, Hotchkiss, Talbot and Fiat.

One of the features of the show will be the uncovering of the first six-cylinder model to be produced by Citroen. The engineering staff has been at work on this model for two years and has designed a car which will be competitive on world's markets. Probably the selling price in France will be between $1,250 and $1,300, this including a 12 per cent luxury tax not applicable to export models. The present Citroen four-cylinder car, of 93 cu. in. piston displacement, is too small for most foreign markets, on which American competition has to be met, but the six-cylinder of 145 cu. in. piston displacement, standard track, longer wheelbase, and a speed of 65 m.p.h., will have a much wider appeal. Citroen and Renault are the only two French makers taking advantage of the opportunity to exhibit at the New York show next January. It is understood that Citroen will send over the new six.

Rosengart to Show Car

Lucien Rosengart will offer to the public at this show his 45 cu. in. four-cylinder three-seater sedan, built to the same designs as the English Austin, and selling at $600, including French luxury tax. A car of this general type was produced by Citroen and abandoned a few years ago. Rosengart claims that he will start with a production of 60,000 the first year.

New suspension systems, independently sprung front wheels, central chassis lubrication, oilless bushings for spring shackles and other chassis parts, oil purifiers, brake refinements and new body styles promise to be among the features of the Paris show.

American Planes Exhibited

WASHINGTON, Aug. 16—For the first time American airplanes were represented in booths at the Paris Salon de l'Aviation, recently, the Department of Commerce announces. Features of the show included special exhibits by two American airplane manufacturers and the practically universal adoption of air-cooled engines in lieu of water-cooled engines in the European exhibits.

Louis Chevrolet Joins Stutz Technical Staff

INDIANAPOLIS, Aug. 15—Appointment of Louis Chevrolet as a member of the technical staff of the Stutz Motor Car Co. of America, Inc., has been announced by E. S. Gorrell, vice-president. Mr. Chevrolet will spend the major portion of his time in the experimental department. He will take up his duties here at once, according to the announcement.

E. R. Parker has also joined the Stutz. He traveled southern states commencing in 1910 as a factory representative with offices in Atlanta, Jacksonville, Fla., and Birmingham. Following this he was manager of factory branches in Cleveland for the Chandler Motor Car Co. and the Studebaker Corp.

Lee Eastman is Elected Packard Vice-President

DETROIT, Aug. 14—Lee J. Eastman, president and general manager of the Packard Motor Car Co. of New York, has been elected a vice-president of Packard Motor Car Co. Mr. Eastman's election carries the distinction of being the first in the parent company of an executive not directly connected with the factory staff.

Mr. Eastman has been with Packard in the distributing field for 13 years and has served as head of two of the largest Packard organizations.

Mr. Eastman will continue as head of the New York Packard company. His factory duties are for the most part advisory.

Dr. Hills Leaves Packard

DETROIT, Aug. 14—Dr. H. H. Hills, vice-president in charge of sales of the Packard Motor Car Co., has tendered his resignation. Dr. Hills has been with Packard 19 years and will remain with the company until a successor is chosen, according to Alvan Macauly, president. Dr. Hills has been in charge of sales, service, export, branch and advertising activities of the company for the last 19 years. He will devote his time to travel and private affairs and will retire permanently from commercial life. Dr. Hills joined Packard in 1909, coming from the Buick Motor Co., where he had been assistant sales manager.

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for AUTOMOTIVE INDUSTRIES.

NEW YORK, Aug. 16—As the year goes on, the general tendency of trade is to increase, and reports for the past week are thoroughly optimistic.

FISHER'S INDEX

Professor Fisher's index of wholesale commodity prices experienced another drop in the past week and is now 99.4, comparing with 99.6 the week before and 99.9 two and three weeks before.

FREIGHT CAR LOADINGS

The American Railway Association announced that the loading of revenue freight for the week ended July 28 totaled 1,033,976 cars, representing an increase of only 160 cars over the preceding week. Increases this week were reported in the loading of grain and grain products, coal, and forest products.

CROP CONDITIONS

The estimate of grain crops in the United States issued by the United States Department of Agriculture on Aug. 9, based on condition Aug. 1, places the winter wheat crop at 578,599,000 bushels, as compared with 553,288,000 bushels actually harvested in 1927. The outlook for spring wheat has greatly improved, and, whereas the estimate a month ago was only 182,623,000 bushels, the present forecast is put at 228,350,000 bushels. In 1927 there were 243,152,000 bushels of spring wheat actually harvested. The probable production of corn is placed at 3,029,561,000 bushels, which compares with 2,773,708,000 bushels harvested in 1927.

BANK DEBITS

Bank debits to individual accounts in 140 cities outside of New York for the week ended Aug. 8 amounted to $5,134,000,000, showing an increase of 5 per cent over the total for the corresponding period last year.

STOCK PRICE INDEX

Professor Fisher's index of stock exchange prices for the week ended Aug. 11 reached 386.4, the highest so far this year. This compares with 377.1 a week before and 368.0 four weeks before. During the past week call money ranged between 6 and 8 per cent, and, although trading was dull, the market remained irregular but firm.

FEDERAL RESERVE REPORT

The statements of the Federal Reserve Board for the week ended Aug. 8 have not revealed any striking changes. The New York Reserve Bank slightly reduced its discounted bills by $3,118,000, while the combined statement for the 12 banks showed a similar reduction of $24,500,000. Despite this reduction in discounted bills, brokers' loans increased $15,000,000 during the same period. The reserve ratio for the week ended Aug. 8 was 69.5 per cent as compared to 68.6 per cent the week before.

Reeves Sees Business Factors Making Live Last-Half Trade

Year to be One of Best in Industry's History, He Says, With Possibility of New Production Total Being Achieved

NEW YORK, Aug. 14—With active markets foreseen in the automotive trade in the last half of 1928, Alfred Reeves, general manager of the National Automobile Chamber of Commerce, in his mid-year statement of conditions in the industry said the year will be one of the best the industry has enjoyed.

With a production of 2,326,877 set up in the first six months of the year, Mr. Reeves pointed out that the industry has made an auspicious start toward exceeding or approximating the record total in 1926, the first six months of which showed production of 2,483,463. The march toward a new high year has been greatly aided by production of approximately 422,000 in July which Mr. Reeves says is approximately equal to the spring production rate and much higher than the summer rate in either 1927 or 1926.

Factors of prosperity in the last half of the year indicated by Mr. Reeves are the popularity of the new models, the strong position of dealers, activity in the used car field and the stepping up of Ford output.

"One of the best indications of fundamentally sound business conditions," said Mr. Reeves, "is to be found in the prosperity in the light car field. When the mass of the people have money to buy that means prosperity all along the line. It is encouraging to note that the four cars in the lowest price range, namely, Ford, Chevrolet Overland and Durant 4, have all reported exceptionally fine business this year. The low priced field has always been the educator, the trade missionary, for cars in the higher price range. The mass of buyers have purchased the lowest cost transportation as their first car and have then advanced as customers for larger vehicles.

Sees Ford Total Increasing

"Leaders in the industry believe that trade will continue strong throughout the year. Ford's total will mount rapidly, as he is just beginning to get back to normal production. This will have a marked effect on the size of the totals for the last half of the year.

"Style has continued to play an important role in the motor business. There has been a strong public interest in the new offerings which have been presented during the past few weeks. This has tended to make the public motor-minded and has stimulated the buying interest in new up-to-date vehicles.

"The style element will always be a factor in the motor business and for this reason I believe that there will always be a place for small as well as large producers. Some people prefer to have automobiles which are like those of their neighbors, whereas others wish to have a motor car of a type that is different from the mass of vehicles on the road. Furthermore, there is always an opportunity for the competent manufacturer who can develop an individual, beautiful car at a price which the public can afford to pay.

Used Car Market Stronger

"The used car market has been much strengthened by two conditions. The first is that many families are now on a two-car basis, and are adopting the policy of keeping the old car for secondary use. The second factor is that the public has gradually come to realize that it cannot expect to get high values in trade for a used automobile after the vehicle has rendered two or three years of service. New cars are now sold on so close a price basis that there is no opportunity to give the buyer a bonus for his used automobile.

"The position of most of the dealers in the automobile business is sound. The relatively good weather conditions compared with last summer have brought buyers to the showrooms, and the increase in prospects due to the two-car family movement, have enabled dealers to move their merchandise without making heavy sacrifices on used cars.

"Instalment buying has been placed on a sound basis. Whereas formerly three-quarters of the cars were sold on time, this figure has dropped to 60 per cent. The difference represents the marginal number of dubious credit risks. With these risks eliminated, the burden of repossessed cars is done away with, the manufacturer and the dealer are in a sounder financial position, and the industry is spared the cost involved in such operations.

"The strong first half of the year has given employment not only to automobile factories but to approximately 3,000,000 additional workers in allied lines. This in turn has stimulated retail trade, and has helped to strengthen the entire cycle of business with results which should prove favorable for the coming months."

Philippine Imports Rise

WASHINGTON, Aug. 10—Automobiles are playing a major part in modernization of the Philippines, according to advices from Manila to the Department of Commerce, showing that the 28,000 automotive vehicles there have contributed heavily to opening sparsely settled areas, speeding up commerce and enlarging contributions to the government through taxes.

In Manila, alone, there are more than 10,000 automobiles, according to the reports, whereas in 1912 when the registration law was first enforced there were but 1600 vehicles in all the islands.

Growth of automotive imports has been steady, the department is advised, since the deflation years of 1921 and 1922 a total of $3,289,000 in automobiles and more than $6,000,000 in parts, tires, gasoline, oils, tools and equipment having been exported from the United States in 1927. Total Philippine imports of automotive products for that year was $10,271,000, the United States supplying $9,351,000 of this amount.

Buick Plans Output of 1300 Cars Daily

DETROIT, Aug. 10—Buick Motor Co. will increase production to 1300 cars a day, the highest rate in Buick's history, according to E. T. Strong, president. Mr. Strong said that it is probable night shifts will be inaugurated almost at once. The company, he said, for the present will seek to fill its enlarged production schedule without increasing the number of employees.

"The new car is taking hold so rapidly in every section of the country as to demand immediate attention to the problem of filling orders," said Mr. Strong. "Hundreds of telegrams from dealers throughout the United States make it plain that the public's principle reaction to the new car is 'When can we get it?'" said Mr. Strong. "Never in our history have we had so many orders booked ahead in a like time, and never have we felt so happy over prospects."

Durant Sales Gain 20%

ELIZABETH, N. J., Aug. 11—With an increase in production and shipments in July of 24 per cent over July of last year, Durant Motors, Inc., continues to progress. Sales are keeping up with production as shown by state registration returns. These returns show that in June, Durant sales jumped from twelfth to tenth place, and for the first six months have shown an increase of over 20 per cent more than the first half of last year.

Graham-Paige Builds 50,000th

DETROIT, Aug. 11—Graham-Paige Motors Corp. retail sales for the week ending Aug. 4, exceeded the best previous week by 220 cars. The company reports increasing sales, contrary to the usual seasonal trend, and produced its 50,000th car this week, seven months after the new line was announced.

Hupp Signs 48 Dealers

DETROIT Aug. 14—Hupp Motor Car Corp. reports the signing of 48 new dealer contracts in July.

Nash Sees August Establishing Record

Company Has Orders for 35,000 Deliveries—Sees Demand Continuing

KENOSHA, Aug. 11—National demand for the new Nash cars is steadily increasing, according to official reports made by the Nash sales department. For the week ended Aug. 11, new car orders for August delivery totaled approximately 35,000 automobiles, and all indications pointed to a month's demand that will far exceed any month's business volume recorded by the company.

"The steadily growing demand for the new series cars, and the voluntary letters we are receiving daily from owners of the "400's" extolling their performance, coupled with the excellent business outlook, make us feel that we are going to continue at this record business peak for a long time to come," E. H. McCarty, vice-president and director of sales, said today in commenting on the spectacular Nash success. "Without question, August will be the biggest month we ever had and, with production and shipments showing an increase each week, we can see nothing but industrial health ahead.

"Plans for September call for still further increases in production, approximately 40 per cent of which will be confined to the popular Standard Six models. Thirty per cent of the volume will be Special Six models and the remaining 30 per cent will be Advanced Sixes. As near as we can estimate, cars available for shipment in September will be approximately 23,000."

Studebaker Shows 40% Gain

DETROIT, Aug. 11—The Studebaker Corp. of America reports total deliveries in July, 40 per cent ahead of July, 1927. This is the fifteenth consecutive month that Studebaker has reported an increase over the previous corresponding month.

Gets Ambulance Order

SOUTH BEND, Aug. 11—The United States Veterans' Bureau has awarded the Studebaker Corp. of America a contract for 10 ambulances to be delivered to the various hospitals located in all parts of the country. Tests made at Washington, D. C., under the supervision of the government's Bureau of Standards resulted in the order.

Ohio Rubber Builds

CLEVELAND, Aug. 11—Ohio Rubber Co., Willoughby, Ohio, has awarded the Austin Co. a contract for the construction of additions to its factory and office building. Increased production on the part of several prominent automobile manufacturers for whom the Ohio Rubber Co. is manufacturing is responsible for this expansion.

Farm Income Gains 1% in Present Year

WASHINGTON, Aug. 11—Farmers had an income approximately 1 per cent higher during the 1927-1928 season than during the 1926-1927 season, according to a statement made public by the Department of Agriculture. Gross income in the agricultural industry in the most recent season is estimated at $12,253,000,000 by the department as compared with $12,127,000,000 in 1926-1927. These earnings are held to represent an increase in average income per farm operator from $862 in 1926-1927 to $886 in 1927-1928. In 1925-1926 the income was $922 on this basis. The department estimates the farmer earned a return of about 3.4 per cent on his capital at market value, considering farms as business enterprises.

Triphagen Resigns As Reo Sales Head

DETROIT, Aug. 11—Clarence A. Triphagen has resigned as general sales manager of Reo Motor Car Co. Mr. Triphagen resigned more than 30 days ago, effective last Saturday, according to Richard M. Scott, president and general manager. Asked if a successor had been appointed, Mr. Scott said that the position has not been filled, but indicated that an announcement would be made "possibly a week from now."

Mr. Triphagen had been general sales manager of Reo for the past three years. Previous to his appointment he was in charge of the Reo Detroit branch and before that had conducted a Reo agency in Lansing.

Fix Case Name Status

CHICAGO, Aug. 10—J. I. Case Threshing Machine Co. will hereafter have exclusive right to the Case name under an agreement with J. I. Case Plow works. The title of the plow firm has been changed to the Massey-Harris company, after having operated under the Case name for more than 50 years. The Massey-Harris company will be the American division of Massey-Harris, Ltd., of Toronto, and its main offices will be in Racine, Wis.

American Bosch at Peak

SPRINGFIELD, MASS., Aug. 13—American Bosch Magneto Corp. is operating at the highest production schedule since 1920. Excellent July records in both automotive and radio departments will be exceeded this month. Production of magnetos is running heavy.

Knudsen and Grant Visit Trade in West

Production Seven Months Totals 869,297—Millionth Car in September

DETROIT, Aug. 13—With production in 14 Chevrolet Motor Co. factories running at record pace for this period of the year and sales continuing at the highest summer level in the history of the company, W. S. Knudsen, president, and R. H. Grant, vice-president in charge of sales, left Detroit last week for three weeks' business tour of the entire western half of the United States.

In the course of the tour, which will include the leading business centers of the West, the Chevrolet executives will visit with Chevrolet dealers in each community, discuss individual dealer problems and study local business conditions as they pertain to Chevrolet.

Before leaving Detroit, Mr. Knudsen announced that production in the first seven months of the year to Aug. 1, totaled 869,297 cars and trucks, breaking, by a wide margin, all former marks for this period and definitely indicating that the millionth car built in 1928 will come off the production line early in September. More than 800,000 of the 1928 models are now in the hands of owners.

In Kansas City, Mr. Knudsen and Mr. Grant will check the progress of construction work on the newest Chevrolet assembly plant now rising in that city. When completed this fall it will have a capacity of 350 cars a day and will bring Chevrolet's production facilities up to 1,250,000 units annually.

The party will return to Detroit Sept. 1, in time to witness the production of the millionth Chevrolet of 1928 about 10 days later.

California Dealers Junk 1000 Cars in Eight Weeks

SAN FRANCISCO, Aug. 13—More than 1000 cars have been junked by the Motor Car Dealers' Safety & Elimination Bureau, since it commenced operations eight weeks ago. All these cars were turned in by the members of the Motor Car Dealers' Association of San Francisco, of which the safety and elimination bureau is a branch, according to Arthur D'Ettel, business manager of the dealers' association.

In the past, when old and decrepit automobiles were taken in on trades by dealers, the latter sold them to junk dealers, who were supposed to wreck and sell them for junk. Many of these junk dealers, however, patched up the nearly defunct cars and sold them, thereby defrauding the public and maintaining a considerable factor of danger on the highways for other motorists. To lessen these hazards, the motor car dealers organized and incorporated the safety and elimination bureau.

Men of the Industry and What They Are Doing

Cadillac Sales Heads Attend Coast Meeting

At the close of the national Cadillac-LaSalle convention held in Detroit recently, executives of Cadillac Motor Car Co. left Detroit Aug. 9 to hold a special convention in California, for the purpose of outlining sales plans for the 1928-29 season. The California convention will be held Aug. 15 and 16 in Los Angeles with Don Lee, Inc., California distributor of Cadillac and LaSalle cars. Neighboring distributors have been invited to attend.

Following the convention, the Cadillac executives will visit distributors in San Francisco, Portland, Spokane and other Pacific Coast points

Those making the trip for the California meeting are: H. M. Stephens, general sales manager; E. V. Rickenbacker, assistant general sales manager; Nicholas Dreystadt, general service manager; W. W. Lewis, assistant general sales manager and director of advertising, and Major H. J. Cupper, sales promotion. William R. Strickland, assistant chief engineer, and Joseph N. Prentis, assistant chassis engineer, left Detroit for the Coast several days earlier and will join the party in Los Angeles.

Longway Gets Promotion

Appointment of Robert T. Longway as assistant comptroller of General Motors Corp. with all the powers and duties of the comptroller in so far as they pertain to the affairs of the Buick Motor Co. division, was announced by Harvey L. Mallery, vice-president of Buick. Mr. Longway has been associated with General Motors in Flint since its inception.

Ralph De Palma Injured

Ralph De Palma, famous automobile racing driver and now chief engineer of the Lancia American Company, was injured in an automobile accident, Aug. 12. Mr. De Palma, with friends, was driving near Merchantville, N. J., from New York. The whole party were treated for cuts and bruises at the Cooper Hospital, Camden.

Norton Makes Appointments

Howard W. Dunbar, for the last five years assistant sales manager of the Norton Co., has been named works manager of the grinding machine division, and Ralph M. Johnson, formerly a district manager in Connecticut, has been made manager of the Philadelphia district.

Kelleher on European Trip

R. J. Kelleher, general manager of North East Service, Inc., has sailed for Europe. He will visit the North East associate companies at London and Paris and many of the service stations.

Volvo Officer Here on Buying Mission

Gustav Larson, vice-president and chief engineer of the Volvo Co., Gothenburg, Sweden, is in New York and will remain until the middle of September. His headquarters will be at the New York office of SKF Industries. He and two assistants will buy parts and make a general study of the industry. Mr. Larson reports that Sweden will buy approximately 20,000 automobiles this year, of which 85 per cent will be of American manufacture. Approximately 5 per cent of the cars purchased are open cars. Conditions are good in Sweden, the country is working steadily on its roads and the farmers are buying low priced cars in increasing numbers.

Cezanne Plans Visit Here

Henri Cezanne, Paris show manager and secretary of the Bureau Permanent of Automobile Manufacturers, doubtless will be one of the visitors to the New York show next January. "The four shows in the Grand Palais, Paris, will hold me in France until near the end of the year," said Mr. Cezanne, "but I think I can sail on Dec. 26 aboard the France. This visit will coincide with the extension of facilities to European firms to exhibit at the New York show.

Midland Officers Change

H. F. Kulas has been appointed vice-president with supervision of sales of the Midland Steel Products Co. Mr. Kulas formerly was secretary of the company, in charge of production and manufacturing of the Cleveland division. J. E. Maloney, sales manager of the Cleveland plant, will succeed W. W. Langdon, resigned, as general sales manager.

O'Brien Joins Hartford

John J. O'Brien, vice-president of Automotive Standards, Inc., has been named treasurer and member of the board of the Hartford Battery Mfg. Co. J. C. Baldwin has been made assistant to the president of Automotive Standards, Inc., in charge of foreign business. He will go to Paris about Sept. 1.

Hamilton New York Manager

Gears & Forgings, Inc., has opened a New York office with Presley Hamilton in charge as district sales representative.

Pierce-Arrow Awards 8 Veteran Employees

Fifteen thousand persons disported themselves at the annual basket picnic and outing of the Pierce-Arrow Motor Car Co. employees at Erie Beach. The guests of honor were the men who were added this year to the honor roll, composed of those who have been in the service of the company continuously for 25 years.

Myron E. Forbes, president, at a dinner given for the men in Buffalo before the picnic, gave each a diamond-studded service pin, congratulating them upon their records.

Employees honored this year were Rudolph Gerstner, Jacob P. Obenauer, Henry F. Schneider, Charles G. Schnaidt, James R. Way, Robert O. Welker, Samuel Heap and Frederick Bradley.

The chairman of the picnic committee was Norman A. Kirby. He was assisted by J. Frank Burlingame, John G. Stephenson, Harry J. Trautman, William M. Baker, Simeon O. Fellows, Charles J. Kolb, Michael A. Metz and Edward J. Weiser.

Those who attended the outing included Myron E. Forbes, Thomas O'Rourke, sales manager; S. O. Fellows, treasurer; E C. Pearson, secretary, and E. F. Himmele, assistant works manager.

Baker on Franklin Staff

Cannon Ball Baker has joined the technical staff of the H. H. Franklin Mfg. Co. in the capacity of chief demonstrator. He will also conduct various experimental road tests of Franklin cars in conjunction with the engineering department. This move is part of the expansion program Franklin is effecting.

Williams Takes Plane Post

Forrest L. Williams has been made general manager of the Vulcan Air-Craft Co., Portsmouth, Ohio, which was recently formed by the late W. J. Burke, president and founder of the Vulcan Last Corp. A sales organization to extend over the entire world is being organized by John Cecil, sales manager.

Eckerle on European Trip

John Eckerle, president of Aluminum Industries, is traveling in Europe, and will be abroad until October. Mr. Eckerle writes that aluminum alloy pistons are now standard equipment on a majority of the cars manufactured in Europe.

Brown Named Director

Guy C. Brown, vice-president and secretary of the Campbell-Ewald Co., has been elected to the directorate of the Metropolitan Trust Co. of Detroit.

Ford World Output Reaches 4800 Daily

U. S. Plants Approach 4000 Level—Model T Replacements Still Factor

DETROIT, Aug. 13—Production of Ford Model A cars is approaching 5000 units daily, according to Henry Ford. Last Thursday the company manufactured 3951 completed cars in the United States factories alone. The Canadian plant made 500 and foreign plants produced nearly 400 cars. This gave the company world production on that day of 4800 cars.

"Although one-third of our capacity is still applied to the manufacture of parts for the old Model T car, our production is increasing gradually by several hundred cars daily," Henry Ford said. Because of demand for the new car, Mr. Ford plans a maximum production of from 10,000 to 12,000 cars daily, which is 2,000 daily more than he previously expected to reach. On the basis of this statement it appears reasonable the company will reach 5,000 cars daily by Sept. 1. By Dec. 1 the company expects to reach 10,000 cars daily.

"Our present goal is 10,000 cars daily. when we will reach it I do not know—no one knows, for what we are doing is building for a long run. I am entirely satisfied with the way things are going up to now."

There are now 119,797 employees on the payroll at the three Detroit plants which is an all-time record. The company is adding another 100,000 hp. to its production strength at the Ford Rouge plant and there will be more additions to the payroll.

Commenting on the new braking system, Mr. Ford said that more than 100 mechanical operations had to be changed when the brakes were redesigned.

The original brakes, he said, were adequate, Mr. Ford added, "but I am glad we made the change because we now have two independent braking systems."

Use Same Rear Wheel Drums

DETROIT, Aug. 13—To fully comply with the laws in the different states, Ford Model A cars are now turned out with parking brakes which are independent of the four-wheel service brakes. The parking brake acts on the two rear wheels, being applied to the same drums on which the rear wheel service brakes act. These drums are now made in a special two-in-one design, the surface for the emergency brake being next to the wheel and somewhat smaller than and offset from that for the service brake. The parking brake is of the band or flexible shoe type and is self-energizing. The same as the service brakes, the emergency brakes are cadmium-plated to prevent them from rusting and are mounted on a plate of pressed steel.

The steel-spoked wheels of the Ford are built with a pressed steel shell which fits over the brake drum, hence the brake drum is not affected when the wheel is removed, due to tire trouble. Operation of the emergency brake is by hand lever mounted on a short shaft from which there is lever and link connection to a cross shaft. At the ends of this cross shaft are carried short lever arms from which brake rods extend to the brakes on the rear wheels.

British Sales Hold High Summer Level

WASHINGTON, Aug. 16—Cable advices to the Department of Commerce from London indicate that July witnessed a slight seasonal decline in production and sales of automobiles and trucks. Favorable weather made the decrease smaller than usual. Small and medium-sized closed cars continue to gain British popularity. The motorcycle industry is especially active.

Nichols and Akers Leave Falcon Posts

DETROIT, Aug. 13—John A. Nichols, Jr., president and general manager, and Forrest H. Akers, general sales manager of the Falcon Motors Corp., have resigned their positions. Executive offices of Falcon which were opened in Detroit when the company was first formed early in 1927 were closed recently and the executive staff moved to Elyria, Ohio. Previous to becoming president of Falcon, Mr. Nichols was long identified in high executive positions with Dodge Brothers, Inc., and Reo Motor Car Co.

Harger Directs Falcon

TOLEDO, Aug. 15—Falcon Motors Corp. has closed its Detroit executive offices and centraled the business at Elyria where the main plant of the company is located and working ahead on a regular production schedule planned ahead to the end of the year. This is according to a close associate of John N. Willys, who sponsored the Falcon development. R. N. Harger, vice-president of the company, is in active charge of the business since the resignation of Mr. Nichols. The Falcon plant shipped 41 cars on Aug. 10 and is continuing on a very good schedule under Mr. Harger's leadership.

Industrial Convention Set

CHICAGO, Aug. 14—The Society of Industrial Engineers' fifteenth national convention will be held at Rochester, N. Y., Oct. 17, 18 and 19, being staged as a joint meeting with the industrial management council of the Rochester Chamber of Commerce. All meetings will be open to the public. "Profitable Prosperity" will be the theme of the convention.

G.M. Sales in July Increase Over 1927

Deliveries to Buyers Total 177,728 Against 134,749 in July Last Year

NEW YORK, Aug. 14—General Motors' dealers sold 177,728 cars to customers during July, according to announcement made by Alfred P. Sloan, Jr., president. This compares with 134,749 for July of last year and with 206,259 for June of this year.

Sales by divisions to dealers during July were 169,473 as compared with 136,909 last year, and with 136,160 in June of this year.

Comparative figures for the first seven months of this year follow:

Dealers' Sales to Users

	1928	1927
Jan.	107,278	81,010
Feb.	132,029	102,025
Mar.	183,706	146,275
Apr.	209,367	180,106
May	224,094	171,364
June	206,259	159,701
July	177,728	134,749

Divisions' Sales to Dealers

	1928	1927
Jan.	125,181	99,367
Feb.	169,232	124,426
Mar.	197,821	161,910
Apr.	197,597	169,067
May	207,325	173,182
June	186,160	155,525
July	169,473	136,909

Detroit Shows Sales Gain

DETROIT, Aug. 13—A total of 9335 new passenger cars were titled in Wayne County in July, according to the Detroit Automobile Dealers Association. This brings the total for the first seven months to 52,006, compared with 37,103 in the corresponding period last year. A total of 514 commercial vehicles were registered in July, bringing registrations to 3323 for first seven months, compared with 3607 last year.

Schedule Automotive Papers

PHILADELPHIA, Aug. 15—Papers to be read at the American Society for Steel Treating meetings during the National Metal exposition in Philadelphia, Oct. 8 to 12, include "Metallurgical Problems of Transmission Gearing," by E. F. Davis of the Warner Gear Co., "Steel Failures in Aircraft," by F. T. Sisco of Wright Field, and "Applications of Normalized Steels to Crankshafts and Other Automotive Parts," by H. T. Chandler.

Battery Meeting in September

NEW YORK, Aug. 13—Final arrangements are now being made by the program committee of the National Battery Manufacturers Association for the annual convention to be held at the Ambassador Hotel, Atlantic City, Sept. 20 and 21. An entirely new feature for this year's convention will be an exhibit by the associate membership which consists of manufacturers of materials used in the making of batteries.

Six Months' Exports Gain 17% to Set Record of $259,934,682

June Shipments Increase 49.6 Per Cent Over June, 1927, Showing No Seasonal Decline—Canada Leading Car Market

WASHINGTON, Aug. 16—The pivotal month of June in the automotive industry this year saw export records of automotive products smashed by an unprecedented volume of shipments, totaling $45,851,775, the Department of Commerce announces in making public revised statistics. This total was $15,202,626 higher than June, 1927, and $21,960,545 higher than in June, 1926.

It swept the export figures of automotive products for the first six months of 1928 to $259,934,682, an increase of 17.4 per cent over the previous high mark established during the first six months of 1927 when the total shipments amounted to $221,363,106. The gain over 1926 figures during the first half of the current year amounted to 42.8 per cent, or $77,868,109.

The automotive division of the Department of Commerce in an official report called attention to the fact that "in previous years automotive shipments during June have always shown a decided decline as compared with the first five months on account of the usual seasonal inventory period and reduced production incidental to bringing out of new models." The department then calls attention to the fact that "shipments during June of this year maintain the high level which has marked the exports of automotive products since January."

The June shipments this year were 49.6 per cent greater than the June, 1927, shipments, which totaled $30,649,149, and 91.9 per cent greater than the June, 1926, shipments, which totaled $23,891,230.

Despite a production decline of 30,000 units, the total number of passenger car and truck units shipped in June was 47,171, which was less than 800 units under the May shipments of this year. These shipments showed a 70.7 per cent increase over June, 1927, when 19,537 units were shipped.

Canada, although that country took 3330 units less in June, 1928, than in May, 1928, retained her position as leading passenger car market; Australia advanced from fourth position in May to second market of importance in passenger car exports, with Argentina and Sweden taking the next two places. Average value of passenger cars shipped during June was $680.

Argentina took most of the motor trucks, bus and chassis in June, shipments totaling 1636 units, an increase of 183 per cent over the May figure of 578; Brazil was second and Australia third as a market of importance for trucks. Average value of trucks amounted to $669 during June.

For detailed comparison, the department showed that during the first six months of 1927, the United States shipped 159,781 passenger cars and chassis, except electrics, valued at $117,156,945; during the same period of 1928, the shipments of this classification numbered 194,309 units valued at $140,224,661; exports of trucks, buses and chassis during the 1927 period numbered 54,748 units valued at $34,562,184, while the units of this class shipped in the 1928 period numbered 58,957 valued at $40,868,474.

From January to June, 1927, $26,152,609 in parts for assembly were shipped while in the same period for 1928, $29,645,376 of this classification were exported; during the same 1927 period $22,614,200 worth of parts for replacement were exported, this figure mounting to $25,087,990 in the 1928 period.

Oil-o-Matic Interests Buy Mechanical Device

CHICAGO, Aug. 11—Control of the Mechanical Device Co. of Aurora, Ill., has been acquired by C. U. Williams, president, and Walter W. Williams, vice-president of the Williams Oil-o-Matic Heating Corp. Mechanical Devices owns basic patents on a pump and an oilless bearing. Its plant has been moved to the Oil-o-Matic factory at Bloomington, where manufacture of its product will be continued.

Under the terms of the reorganization the common and preferred stock of the old concern will be retired and 5000 shares of common, no par value, issued in their stead. Stockholders of the old company will receive five shares of the new common for each share of the old preferred stock and three shares of new common for each share of old common. New officers are W. W. Williams, president; C. U. Williams, chairman, and F. E. Sperry, secretary.

World Bestos Gains 300%

PATERSON, N. J., Aug. 14—World Bestos Corp. reports sales for the first half of the year as 300 per cent larger than for the same period last year. Distribution has been established in every state during the past year.

July Retail Trade Gains

WASHINGTON, Aug. 16—July sales in 1928 among retail trade concerns were larger than during the same month of 1927, according to a Federal Reserve Board statement just issued. Sales of 478 department stores throughout the country were 3 per cent larger than in July, 1927; sales of mail order houses were 22 per cent larger, and sales of several large chains of five and ten cent stores were 6 per cent larger. Only in Philadelphia and Cleveland reserve districts did department stores show a lower level of business.

Graham-Paige Adds New Body Styles

DETROIT, Aug. 13—Graham-Paige Motors Corp. has announced the addition of a five-passenger coupe and a two-door phaeton, to its line of four-speed models. The five-passenger coupe appears on the Graham-Paige eight and the 129-in. wheelbase six, priced respectively at $2,385 and $2,085. The two-door phaeton is offered on the 119-in. and 114-in. sixes at $1,745 and $1,435. A seven-passenger phaeton also has been added, at $2,410 on the eight and $2,110 on the 129-in. six.

The two-door phaeton is a departure from the usual practice, having been designed for those who desire a car having space for four passengers in any weather, instead of a rumble seat arrangement. Doors of unusual width, one on each side, serve as the entrance to both front and rear seat. The front seat is divided and either half may be folded forward, giving easy access to the rear passenger compartment.

Extend Building Plans

EVANSVILLE, IND., Aug. 11—Changes in the original plans for the $1,000,000 body building plant of Motor Bodies, Inc., subsidiary of the Graham-Paige Motors Corp., will incorporate additional units entailing an additional cost of $100,000, according to W. H. Neely, president.

Dodge Bros. Field Men Meet Chrysler Officers

DETROIT, Aug. 14—Approximately 150 field men of the Dodge Bros. Corp. division of Chrysler Corp. were at the factory last week to meet executives of the Chrysler Corp. The idea of the convention was to inform the field men first hand of the plans and policies which the Chrysler Corp. has in mind so that they can go back into the field and convey a correct picture of the entire situation to the Dodge Brothers dealers.

Among those who addressed the field men were Walter P. Chrysler, Fred M. Zeder, K. T. Keller, B. E. Hutchinson, J. E. Fields, John R. Lee, W. M. Purves, Harry New, Henry Krohn and Howard Sneathen.

Seiberling Sales Increase

AKRON, Aug. 6—July sales of the Seiberling Rubber Co. exceeded $2,000,000, an increase in dollar volume of 41 per cent over the sales in July of last year.

California to Rule on Fuel Tax Right

Constitutionality is Attacked on Grounds Similar to Illinois Contest

SAN FRANCISCO, Aug. 13—Automobile dealers' associations of California probably will stand with the state in what promises to be a long and involved legal battle over the three-cent gasoline tax. The dealers consider that whatever sales resistance may be raised by the tax is more than counter-balanced by the new-highway construction made possible by the funds from the tax.

W. P. Crawford, an attorney, backed by 58 taxpayers from widely-scattered sections of California, has filed suit in the Federal court here to have the gas tax—or any gasoline tax—declared unconstitutional. The basis of the complainants' attack is that the tax is a toll on public roads and is, therefore, unconstitutional.

Beyond this, Mr. Crawford and the complainants charge that the gasoline vending companies and individuals are costing the state approximately $90,000 a day in interest on moneys of which they have the use for more than three months, between the time they collect the tax, and the date on which they turn it in to the state. The complainants further demand a refund of taxes collected, and ask an order restraining the state comptroller, Ray L. Riley, from further collection of the tax. George B. Williams, of San Francisco, who operates cars for hire, is the leading figure in the suit.

The complainants further charge that "whereas, under the Federal State aid for new roads, provision is made that no toll can be charged for these highways, the collection of the gasoline tax is in fact the levying of a toll in contravention of the law." Another of their contentions is that the tax law provides for a gift by the state, since those who buy gasoline for any purpose other than automotive receive a refund of three cents a gallon from the state, whereas, the gasoline companies deduct 1 per cent for evaporation.

Will Claim Privilege Tax

Comptroller Riley, who, with B. B. Meek, state director of public works, and Ralph W. Bull, chairman of the state highway commission, conferred with U. S. Webb, state's attorney-general, announced that the defense would be based on the claim that the "motor gasoline tax is a privilege tax, levied on the sale of gasoline at first hand, either from the manufacturer or the importer of the product. . . . If the plaintiffs in this action are successful," Mr. Riley continued in his statement, "it will be at the expense of those who received rebates of the tax they paid on gasoline used for other purposes than the propulsion of motor vehicles."

Mr. Riley denied that the distributors of gasoline have the use of state moneys for 90 days.

Mr. Crawford stated that the suit is based in part on the decision of the Supreme Court of Illinois, which recently declared unconstitutional the two-cent gasoline tax in that state. Mr. Crawford lost a similar legal attack on the Washington state gasoline tax law.

Tax to Yield $32,000,000

SAN FRANCISCO, Aug. 13—Returns to the state from the 1928 collections of the three-cent gasoline tax will be $32,000,000 or more, according to an estimate prepared by the state board of equalization. For the first quarter of 1928, collections from this tax totaled $8,477,293, breaking all records, and exceeding collections for the same quarter of 1927 by $3,124,699. The additional one cent on the tax, which was imposed at the end of July, 1927, is credited with the greater part of the increase.

To Revise Traffic Code

SAN FRANCISCO, Aug. 13—Remodeling of the California State Motor Vehicle Act to bring it up to date and into conformity with the uniform code adopted by 58 California cities, will be started at a conference called for Aug. 24, in San Francisco. Percy E. Towne, director of the California State Automobile Association, issued the call for the statewide conference after consultation with Governor C. C. Young, and Senator Arthur H. Breed, of the state senate highway committee. The California code has been used as a model by many states in formulating their own motor-vehicle acts, and in its major features was incorporated practically without change in the national uniform code drawn by the conference called by Secretary of Commerce Hoover.

More Cities Using Two-Level Traffic

NEW YORK, Aug. 10—Increased adoption of the policy of separating crosswise motor traffic from main thoroughfares at busy intersections by elevating or depressing crosswise traffic is noted by the street traffic department of the National Automobile Chamber of Commerce. In some cases this grade separation is effected by raising the level of one street slightly and depressing the level of the other so that there is a minimum change of grade on either thoroughfare. Among the cities which have adopted such improvements are New York, Chicago, Detroit, Pittsburgh, St. Louis and San Francisco.

Retail Sales Show High Totals in July

Louisville Business Gains 78 Per Cent Over July, 1927 —Used Cars Active

LOUISVILLE, KY., Aug. 11—A big month was experienced by Louisville automobile dealers in July, when sales of passenger cars totaled 1012 cars, a gain of 78 per cent over July, 1927, when 568 cars were sold; and a gain of 175 cars over June of this year. It was the second largest month of 1928, May having shown sales of 1034 cars.

Every month of the 1928 season has shown a gain, total sales for seven months having been 5716 cars, as against 4498 last year, or a gain of 1218 cars. Sales would have been larger if all companies could have made deliveries, as several dealers are behind.

In addition to passenger cars there were 93 trucks delivered during July. Sales by cars show Ford with 177 cars delivered in July, the largest deliveries here in many months. Other makes showed as follows: Auburn 5, Buick 16, Cadillac 5, Chandler 3, Chevrolet 293, Chrysler 40, Dodge 24, Durant 23, Erskine 15, Essex 82, Ford 177, Franklin 4, Graham-Paige 47, Hudson 12, Hupmobile 15, Jordan 1, La Salle 3, Lincoln 4, Marmon 1, Moon 1, Nash 26, Oakland 12, Oldsmobile 34, Packard 17, Pierce-Arrow 3, Plymouth 4, Pontiac 59, Reo 14, Star 1, Studebaker 25, Stutz 1, Whippet 37, and Willys-Knight 8.

Truck deliveries were Chevrolet 31, Ford 21, G.M.C. 9, Graham Brothers 4, International 6, Kissel 1, Mack 3, Reo 7, Schacht 7, White 3, State 1.

At the same time sales of used cars have been keeping pace with sales of new cars, and gains in stocks of used cars have not been large, inventories being about on a par with last year. Allowances are not large, as several dealers are having trouble in making deliveries and are not showing much anxiety to trade at long prices.

Adopts Doering Name

NEWARK, N. J., Aug. 14—The Duro Co., manufacturer of spark plugs, as the result of a suit brought by the Duro Co., manufacturer of water system pumps, has been enjoined from use of the word "Duro" on its product, or in its corporate name. The name has been changed to the Doering Spark Plug Co. The word "Doering," written in script, has been adopted as the company's trade mark.

Andrews Names Erickson

NEW YORK, Aug. 14—Gen. Lincoln C. Andrews, director general of the recently formed Rubber Institute, has announced that the Erickson Co., New York, has been appointed advertising counsel.

New Tire Warranty Guarantees Quality

Manufacturers and Dealers Subscribe to Protection Against Defects

NEW YORK, Aug. 16—Revision of the warranty on pneumatic tires, endorsed by tire manufacturers and amounting to a perpetual guarantee against defects, was announced today to 125,000 tire dealers in the United States. Forty-four tire manufacturers, members of the recently organized Rubber Institute, and supplying 95 per cent of the tires made in America, are subscribing to this warranty. The warranty reads as follows:

"Every pneumatic tire of our manufacture bearing our name and serial number is warranted by us against defects in material and workmanship during the life of the tire, to the extent that if any tire fails because of such defect we will either repair the tire or make a reasonable allowance on the purchase of a new tire.

In commenting on this new warranty, General Lincoln C. Andrews, director-general of the Rubber Institute, said:

"The reputable manufacturer always stands behind his quality product to make good any article in which a defect may have developed due to faulty material or workmanship. The purpose of this warranty is to provide for the handling of all claims on a basis of adjustment which will be fair to all consumers. Adjustments will be restricted to defective tires only and replacements will be based on reasonable expectancy and without any limitations regarding time or mileage. This is a better protection to the individual user than any definite mileage guarantee that can be written.

"Where a tire goes wrong what the driver needs is service, not a guarantee. Manufacturers, realizing this, have spread over the whole country a network of small sales stores which give all manner of tire service right where it is needed. The maintenance of such widespread services depends upon the public support of these local tire merchants."

Tire Shipments Total $197,079,000 in Quarter

NEW YORK, Aug. 13—Tires and tire sundries shipped during the second quarter of 1928 attained a value of $197,079,000, according to statistics compiled by the Rubber Association of America as the result of its second quarter questionnaire. This compares with $211,948,000 for the corresponding quarter a year ago and with $179,615,000, for the first quarter of the current year.

Crude rubber consumed in this production amounted to 81,323 long tons as compared with 82,648 for the second quarter of 1927, and with 80,871 for the first quarter of the current year. Total crude rubber used for all products during the quarter was 95,220 tons as compared with 94,983 tons last year and with 95,273 for the first quarter of 1928.

Crude rubber on hand at the end of the quarter is estimated at 87,771 tons, with total crude rubber afloat placed at 38,478 tons. Crude rubber arrivals during the period, based on figures from the United States Department of Commerce, were 97,232 tons.

Rains Bring Increase in Hardwood Prices

ATLANTA, Aug. 15 — Demand for southern hardwoods has been unusually heavy the past two or three weeks from automobile and body plants, sales considerably heavier than they were at this time last year and the outlook very promising for the next few months. Production, however, has been seriously interfered with by rains, and dry stocks of anything in the hardwood list are difficult to obtain. As a result of this shortage and the increasing demand, prices through the whole list have been on an upward grade since the last of July.

Automobile factories in the Middle West are placing sizable orders for the thicker dimensions of the best grades of white ash, and a fair number of orders for the best grades of maple and elm, while sales of sap gum to this industry have been particularly heavy of late. Most buying is for current or near future wants but two or three of the larger plants have recently placed large orders for their needs up to 60 and 90 days.

Body manufacturers in the Southeast have been unusually heavy buyers of southern hardwoods recently, and apparently are facing an excellent period of business the rest of this year as orders are for needs well ahead, and in some cases for wants during the last quarter.

Automotive industries have been the heaviest buyers of southern hardwoods ever since the first of the year, and present indications are that they will continue the leading buyers the rest of the year.

Rubber Trading Firm

NEW YORK, Aug. 13—Stocks of prepared rubber in Ceylon on June 30 are placed at 5000 tons on the estates and 4300 tons in the hands of dealers, according to the census of the Rubber Growers' Association, as reported by F. R. Henderson Corp.

Exportable allowance for the six months ended June 30 was about 27,000 tons, but the actual amount exported was only 21,500, the report continues.

Trading last week was generally firm, although slight recessions were recorded at the close of the week, attributed by the Henderson company to profit taking.

Financial Notes

American-La France & Foamite Corp. reports net profit for the first half of 1928 as $319,999 for fire apparatus, Foamite and sundry sales operations, and a net loss of $180,900 for commercial truck operations. The loss was charged against a special reserve and not against profit from other departments. For the quarter ended June 30, the loss from the truck department was $51,428 and the profit from other departments was $168,778.

Briggs Mfg. Co. reports for the quarter ended June 30, net income of $1,356,125, equal to 67 cents a share on 2,003,225 shares. Net income for the preceding quarter was $679,428, or 33 cents a share. For the second quarter last year the net income was $1,518,625, or 75 cents a share. Net income for the first half of this year was $2,035,553, or $1 a share, compared with $3,033,281, or $1.51 a share, for this period last year.

Gardner Motor Co. reports profit of $201,574 before Federal taxes for the first six months of the current year. This compares with $140,958 for the corresponding period a year ago and is equivalent to 80 cents a share. Balance sheet as of June 30 shows current assets as $860,878 with current liabilities of $162,120 as compared with current assets of $1,353,020 and current liabilities of $378,354 of June 30, 1927.

Bendix Corp. reports for the first half a net income of $1,393,907, equivalent to $6.19 a share earned on 225,000 shares of capital stock. This compares with $550,835 in the first half last year, equivalent to $3.01 a share on 65,000 class A shares and $2.26 a share on 157,200 class B shares.

Vanadium Corp. of America reports net income for the six months ended June 30 as $969,492 after all charges. This is equivalent to $2.57 a share and compares with $1,110,602, or $2.94 a share, for the first half of 1927.

Mullins Mfg. Corp. reports profits from July operations as $104,022 before Federal taxes. This compares with profit of $51,398 in July, 1927.

Commerce Survey Ready

WASHINGTON, Aug. 16—The 1928 edition, Vol. 1, of the Commerce Yearbook, official survey of the nation's commerce and industry, is now ready for distribution the Department of Commerce announces. It can be obtained from the Superintendent of Documents, Washington, for $1 in check or money order. Vol. II, covering foreign nations, will not be ready until about Sept. 1.

Chance Vought Shows Gains

NEW YORK, Aug. 11 — Chance Vought Corp. shipped $302,750 worth of planes to the Navy Department and had a sharp increase in its commercial shipments in July. Several new contracts were closed with two South American Governments. The company enjoyed the greatest July production in its history.

Steel Prices Rise for Closing Quarter

Full-Finished Sheets Maintain Level to Retain Present Favorable Volume

NEW YORK, Aug. 16—Leading independent sheet producers in the Mahoning Valley and Illinois-Indiana district announced early this week a $2 per ton advance in their fourth-quarter black sheet prices, the new base being 2.75 cents, Pittsburgh, and 2.90 cents, Chicago. The fourth-quarter price for blue annealed sheets is 2.00 @ 2.10 cents, Pittsburgh, with the Chicago price unchanged at 2.15 cents. No change was announced in the fourth-quarter price for full-finished automobile sheets which remain at 4.00 cents, Pittsburgh.

The interpretation put in many quarters upon these announcements is that their principal object is to quicken the placing of common sheet business at going prices. Finishers of automobile sheets have little to gain from "smoking out" business at the going price. They have nothing to complain on the score of volume, but solely of the inadequacy of price. The only sort of a price advance that would benefit them would be one that would immediately show up in billings. To put up a higher price for consumers to shoot at, would hardly redound favorably to a price situation which is about as firm as competitive conditions in all branches of the steel industry permit.

There is talk of higher prices on cold-finished steel bars. In fact, there is nothing but talk of higher prices in all departments of the market, but every so often, there occurs a dip in the rate at which specifications for this or that product are received, and transitory as the slowing down may be, it tends to modify the enthusiasm for upward price revision. While the stage is all set for higher prices, the question is whether consuming support will be sufficient for a worth while run.

Pig Iron—Blast furnaces are in better position as regards current quarter orders, and iron is being melted at an increasing rate. Moreover, the market for scrap has moved sharply higher. While foundry iron prices have undergone no change, there is less shading by sellers in evidence.

Aluminum—Routine conditions prevail. Imports are light. Bonded stocks continue light. Prices are entirely unchanged.

Copper—Producers are trying to stabilize the market at the prevailing price level of 14¾ @ 14⅞ cents, delivered Middle West. Manufacturers of automotive brasses, etc., complain of considerable price-cutting.

Lead—Storage battery demand is light. The market continues fairly steady.

Zinc—The market is maintained on a 6¼ cent, East St. Louis, basis by the smelters who are working in closer harmony with the ore producers.

Tractor Exports Gain 30%

WASHINGTON, Aug. 16—Tractors and parts valued at nearly $30,000,000 formed the outstanding item in exports of agricultural implements and machinery from the United States to foreign countries during the first six months of 1928, the Department of Agriculture announces. This amounted to an increase of almost 30 per cent over the same period of 1927.

Three German and Six American Companies Submit Bids for Two New Navy Dirigibles

WASHINGTON, Aug. 16 — Three German and six American firms were found to be competing for the design or construction of two monster dirigibles destined to give the United States supremacy in the field of lighter-than-air-craft when bids were opened by the Navy Department for two airships each of which will dwarf the Los Angeles.

Specifications for the new craft include 6,500,000 cu. ft. capacity for helium, rigid type, at a cost not to exceed $8,000,000 for both. Navy Department officials estimate the size of the new dirigibles as three and one-half times the size of the erstwhile monster Los Angeles and the cruising radius of the new craft at approximately 10,000 miles; the maximum cruising radius of the Los Angeles being between 3500 and 4000 miles.

The Goodyear Zeppelin Co., which in 1927 won a $50,000 prize for design of rigid airships, was among the bidders. These bids were the second batch called for following complications ensuing some time ago on the first group.

The amounts of the bids and details were withheld by the Navy Department. The names of the bidders were made public and the announcement was made that it would require several weeks for analysis. The bidders were:

For design: Max Kastner, Apolda, Germany; Gustav W. Hagermann, Oschatz, Germany; Schutte & Co., Berlin, Germany; Albrecht Luck, New York; Trent Engineering & Machinery Co., Los Angeles; E. Pollok, Brooklyn, N. Y.

For design, or design and construction: American Brown Boveri Electric Corp., Camden, N. J.

For design and construction: Goodyear Zeppelin Co., Akron; Geiser & Seth, Chicago. Intention to file for design and construction, Robert T. Pollock, New York City.

N.S.P.A. Campaign to Tell Services of Association

DETROIT, Aug. 14—National Standard Parts Association will start a national trade paper advertising campaign in September to tell the repair trade its aims and purposes and to explain the products and services of the association. E. P. Chalfant, executive vice-president, said the campaign would tell the advantages of the association to its members and those who do business with its members.

The first advertisement will include a map in color of the United States and Canada showing cities in which N.S.P.A. jobbing houses are located. The advertisement will carry also a list of the 75 replacement items, maintenance materials, shop tools and equipment distributed through this organization. The campaign will be built around the emblem of the association and will tie in with local window displays and posters.

Deere Company Builds

MOLINE, Aug. 11—The John Deere Plow Works has started construction upon its new two-story building, replacing building E, erected in 1881, and building D, the old blacksmith shop of the original Deere group. The new structure will have an operating area of 127,000 sq. ft. and its north 75-ft. section will be four stories high, with all walls designed to carry an eight-story building.

New Goodyear Dirigible Carries Four Passengers

AKRON, Aug. 11—Goodyear Tire & Rubber Co.'s latest dirigible, the "Puritan," was formally christened with liquid air at the Akron airport this week. In addition to the "Puritan," Goodyear owns the "Pilgrim." The latter is famous as the smallest blimp in the world.

The new blimp is 128 ft. long, 37 ft. in diameter and has a capacity of 86,000 cu. ft. of helium gas. It is eight feet longer than its sister ship, seven feet greater in diameter and a greater gas capacity by 33,000 ft. It is propelled by two air-cooled engines set outside the cabin to insure minimum of noise and vibration. A cruising speed of 46 m.p.h. can be maintained and maximum speed is 55 m.p.h. The blimp will accommodate four passengers. The craft is equipped with two rudders, one above and one below to insure easier handling and a greater range of performance in the air. The ship has dual control. One of the new features is an airplane wheel which facilitates landing and ground performance.

To Meet in Los Angeles

CLEVELAND, Aug. 15—The American Society for Steel Treating will hold its semi-annual meeting in Los Angeles in connection with the National Metal Congress and the Western States Metal and Machinery Exposition. The dates are Jan. 14 to 18.

Opens New York Office

NEW YORK, Aug. 15—Universal Credit Co., formed last May to finance time sales of Ford products, has opened a New York office. Offices had been opened previously in Detroit and Kansas City.

Studebaker Models End 30,000 Mile Run

AMATOL, N. J., Aug. 9—Traveling at an average speed of 68.3711 m.p.h. for 30,000 miles, a Studebaker President model roadster completed its test run at Atlantic City Speedway yesterday. Close behind this roadster was another of the same model. This second one covered the distance in 26,329 consecutive minutes, 2 minutes more than the faster car, and at an average speed of 68.3648 m.p.h.

Two President model sedans traveled the 30,000 miles at an average speed of 63.993 and 64.1534 m.p.h. The run was started on July 21 and terminated at 11 o'clock on Aug. 9. Timing was electrically handled by the American Automobile Association. Also, all four cars were checked by the American Automobile Association technical committee both before and after the run with regard to their stock status and standard equipment.

Nagel Offers Indicators

DETROIT, Aug. 11—The Nagel Electric Co., Inc., of Toledo is offering a complete new line of heat indicators in four different models for clamping to the steering column, the dash, and mounting flush on the dash for all makes of cars. Besides this line, the Nagel Company will feature three models of instruments expressly designed for the model A Ford and the Ford AA truck.

Start Oakland Foundry

DETROIT, Aug. 9—Work on the Oakland Motor Car Co. foundry at Pontiac was started yesterday. The plant will be ready for occupancy in December.

Coming Feature Issues of Chilton Class Journal Publications

Oct. 10—Marketing Annual for 1929—Motor World Wholesale.

Nov. 17—Production and Factory Equipment Issue—Automotive Industries.

Denver-Colorado Springs Highway Covers 150 Miles

DENVER, Aug. 11—Elaborate ceremonies, participated in by citizens of Denver, Littleton, Castle Rock, Sedalia, Palmer Lake, Monument and Colorado Springs, and attended by thousands of motorists today marked the formal opening of the paved highway between Denver and Colorado Springs, celebrated at Palmer Lake, the highest point on the route. The chambers of commerce of the interested cities were in charge of the celebration. This now gives Colorado an uninterrupted stretch of concrete highway from Colorado Springs to Fort Collins, some 150 miles in length, and when present plans and projects already under way are completed the road will extend to Pueblo and on to La Junta in the southeast corner of the state.

Moon Shipments Gain 20%

ST. LOUIS, Aug. 11—Stanley Moon, of Moon Motor Car Co., reports shipments in July as 20 per cent above June. Each month has shown higher shipments than the preceding month all this year.

Oakland Sales Gain 63% in Seven Months

DETROIT, Aug. 11—Oakland Motor Car Co. sold 22,704 Oakland and Pontiac cars during July, according to W. R. Tracy, vice-president in charge of sales. This compares with 16,752 units in July, 1927, a gain of 35½ per cent and brings the total shipped since Jan. 1 to 184,252 cars. The corresponding performance for the first seven months of 1927 was 112,888 units, or a gain of 63 per cent this year over last.

Mr. Tracy said, "our combined output of Oakland and Pontiac cars in 1927 was 192,966 units. By the end of July of this year our sales had mounted to 184,252 new cars, leaving less than 9000 units to go until we surpass the entire output of last year, which in turn was 40 per cent better than in 1926.

"Extensive plans laid for the late summer and fall of 1928 indicate that we will top last year's performance easily by another 40 per cent or more. Sales of Pontiac cars will take on an added spurt by reason of refinements announced recently."

Organize Rubber Company

DETROIT, Aug. 9—A group of Eastern men have formed the Bay City Rubber Co. and have purchased the Wildman Rubber Co. plant at Bay City, Mich. and expect to have the plant in operation in three months, making 2500 inner tubes daily. The new company will be managed by H. J. Lucier of Boston. Machinery has been ordered. The Wildman plant cost $5,060 but was never equipped with machinery.

Calendar of Coming Events

SHOWS

Aeronautical Exposition, Coliseum, Chicago ..... Dec. 1-9
American Electric Railway Ass'n, Public Auditorium, Cleveland.. Sept. 22-28
American Road Builders Association, Inc., Cleveland Auditorium.. Jan. 14-19
American Society for Steel Treating, Commercial Museum, Philadelphia ..... Oct. 8-12
American Welding Society, Commercial Museum, Philadelphia..... Oct. 8-12
Automotive Equipment Association, Coliseum, Chicago ..... Oct. 22-27
Berlin ..... Nov. 8-18
Brussels ..... Dec. 8-19
Buenos Aires ..... Nov. 29-Dec. 9
*Chicago, National, Coliseum, Jan. 26-Feb. 2
Leipzig ..... Aug. 26-Sept. 1
London, passenger cars ..... Oct. 11-20
Montevideo ..... Nov. 10-19
National Air Races, Los Angeles. Sept. 11-12
National Standard Parts Association, Cleveland Auditorium... Oct. 29-Nov. 3
*New York, National, Grand Central Palace ..... Jan. 5-12
Paris, passenger cars ..... Oct. 4-14
Paris, trucks ..... Nov. 15-25
Prague ..... Sept. 1-9
Salon, Automobile Salon, Inc., Hotel Drake, Chicago ..... Jan. 26-Feb. 2
Salon, Automobile Salon, Inc., Hotel Biltmore, Los Angeles..... Feb. 9-16
Salon, Automobile Salon, Inc., Hotel Commodore, New York ..... Dec. 2-8
Salon, Automobile Salon, Inc., Palace Hotel. San Francisco... Feb. 23-Mar. 2
Toronto, Can. ..... Aug. 24-Sept. 8

*** will have special shop equipment exhibit.**

CONVENTIONS

American Electric Railway Ass'n, Public Auditorium, Cleveland... Sept. 22-28
American Gear Manufacturers Association, Statler Hotel, Buffalo, N. Y., Oct. 11-13
American Institute of Mining and Metallurgical Engineering, Metals Division, Benjamin Franklin, Philadelphia ..... Oct. 8-12
American Manganese Production Association, Mayflower Hotel, Washington ..... Sept. 10-11
American Road Builders Ass'n, Inc., Cleveland Auditorium ..... Jan. 14-19
American Society for Steel Treating, Commercial Museum, Philadelphia ..... Oct. 8-12
American Welding Society, Commercial Museum, Philadelphia..... Oct. 8-12
Automotive Equipment Association, Coliseum, Chicago ..... Oct. 22-27
International Air Conference, Washington ..... Dec. 12-14
Machine Tool Congress, joint meeting with Machine Shop Practice Division, American Society of Mechanical Engineers, Cincinnati, Sept. 24-27
Motor & Accessory Manufacturers Association Credit Managers Conference, Hotel Statler, Buffalo.. Sept. 12-14
Mid-West Motor Truck Transportation Congress, Indianapolis.. Oct. 23-26
National Highway Congress, Mexico City ..... Oct. 3-6
National Safety Council, National Congress, New York ..... Oct. 1-5
National Standard Parts Association, Hollenden Hotel, Cleveland, Oct. 29-Nov. 3
Society of Industrial Engineers, Rochester, N. Y. ..... Oct. 17-19
World Motor Transport Congress, Rome ..... Sept. 25-29

A. S. M. E.

Cincinnati, Oct. 22-25 — Machine Shop Practice.
Cleveland, Sept. 17-20—Fuels.

S. A. E.

National

Chicago, Dec. 6-7—Aeronautic.
Detroit, Book-Cadillac, Nov. 22-23—Production.
Detroit, Book-Cadillac, Jan. 15-18—Annual.
Los Angeles, Sept 11-12—Aeronautic.
Newark, Robert Treat Hotel, Oct. 17-19—Transportation.
New York, Hotel Astor, Jan. 10—Annual Dinner.

RACES

Great Britain ..... Sept. 22
Italy ..... Sept. 2
Salem ..... Oct. 12
Syracuse ..... Sept. 1